Appendix K
Noise Technical Report

ESA

ROYAL VISTA RESIDENTIAL PROJECT
COUNTY OF LOS ANGELES, CALIFORNIA

Noise and Vibration Impact Study

Prepared for
RV DEV, LLC
4 Park Place, Suite 700
Irvine, CA 92614

March 2023

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Appendix

A. Measured Noise Data

ROYAL VISTA RESIDENTIAL PROJECT

Noise and Vibration Impact Study

Executive Summary

The Royal Vista Residential Project (Project) proposes to redevelop an approximately 75.65-acre site, which currently comprises a portion of the existing Royal Vista Golf Club, with residential and open space uses. The Project would develop a total of 360 residential units, consisting of 200 detached single-family homes, 88 attached residential units (58 duplex units, 30 triplex units) and 72 townhomes. All 72 townhomes and ten triplex units would be set-aside for sale to middle to moderate-income households. The Project would also include approximately 28 acres of open space areas.

The purpose of this Noise and Vibration Impact Study is to assess and discuss potential noise and vibration impacts that may occur with the implementation of the proposed Project. The analysis describes the existing noise environment in the Project area, estimates future projected noise levels at the noise-sensitive receptors in the Project vicinity and those proposed on the Project Site, and identifies the potential for significant noise and vibration impacts.

Project Construction

The following Project Design Feature is incorporated into the proposed Project description and will help to reduce and avoid potential construction impacts related to noise:

> **PDF NOI-1: Control of Construction Hours.** Construction activities occurring as part of the Project shall be subject to the limitations which states that construction activities may occur between 7:00 a.m. and 7:00 p.m. Mondays through Saturdays. No construction activities shall be permitted outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the Chief Building Official or his or her authorized representative.

The following Project Mitigation Measures apply to the proposed Project and will help to reduce and avoid potential construction impacts related to noise:

> **Mitigation Measure NOI 1: Temporary Construction Noise Barriers.** Temporary construction noise barriers shall be erected along the Project boundary that separates on-site active construction areas and off-site sensitive receivers within 200 feet of the Project boundary. Such noise barriers shall have a minimum height of 10 feet above ground to block the direct line-of-sight between on-site active construction areas and off-site sensitive receivers, and provide a minimum noise reduction of 12 dBA.

Mitigation Measure NOI-2: Construction Equipment Noise Control. Prior to issuance of grading permits, the County/Project applicant shall incorporate the following measures as a note on the grading plan cover sheet:

- Construction equipment, fixed or mobile, shall be equipped with properly operating and maintained noise mufflers consistent with manufacturers' standards and capable of reducing equipment noise levels by a minimum of 3 dBA.
- Construction staging areas shall be located at the greatest distance feasible from off-site sensitive uses during Project construction.

The Project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the Project Site, whenever feasible. **Mitigation Measure NOI-3: Mobile Noise Barriers.** For off-site improvements related to the traffic signal installation, the contractor shall install temporary noise barriers between the active construction area and the off-site noise-sensitive receptors. The mobile noise barriers shall achieve sound level reductions of a minimum of 10 dBA between the Project construction sites and the sensitive receptor location. These temporary noise barriers shall be used to block the line-of-sight between the engine of the crane and similarly elevated ground-level noise-sensitive receptors. The barriers should allow for repositioning in order to block the noise at the sensitive receptor as construction activities move along the Project boundary. A noise barrier is not required if it would pose a safety risk or unreasonably prevent access to the construction area as deemed by the on-site construction manager such as in areas that have limited equipment maneuvering space or access. Any barrier capable of a reduction greater than 12 dBA would require greater height and heavier noise insulation which would make mobility of the barrier infeasible and cause safety concerns related to barrier stability. Further, noise barriers would only be effective if they block the line-of-sight to sensitive receptors. The contractor shall provide documentation verifying compliance with this measure.

Mitigation Measure NOI-4: Restricting Pile Driving and/or Vibratory Roller Activities. During construction vibratory pile drivers and/or vibratory rollers shall not be used within 75 feet of residential buildings adjacent to the Project Site.

Project Operations

No mitigation measures for noise and vibration impacts are required during Project operation.

ROYAL VISTA RESIDENTIAL PROJECT

Noise and Vibration Impact Study

1.0 Introduction

This Noise and Vibration Impact Study is prepared by ESA to support the environmental review of the proposed Royal Vista Residential Project (Project).

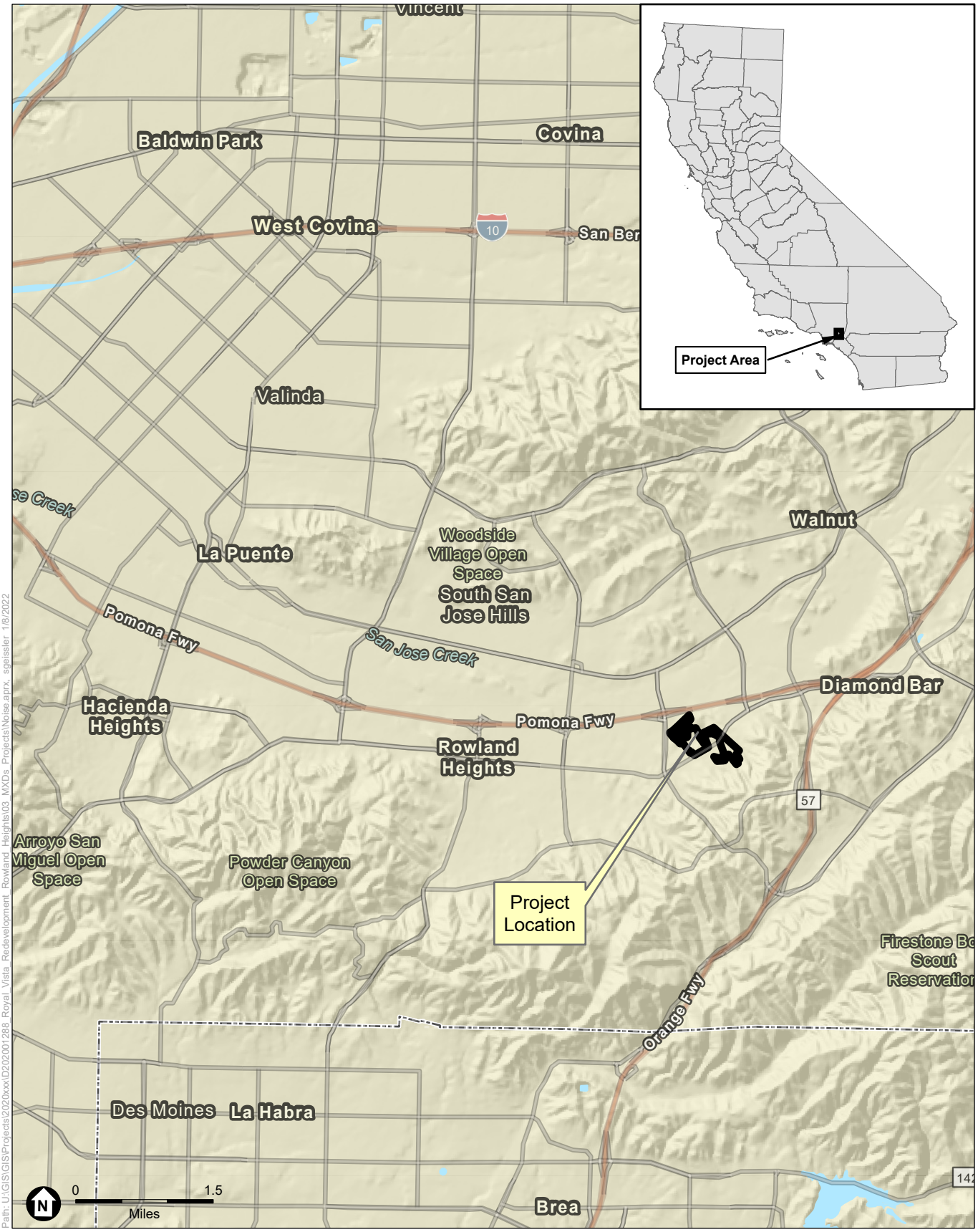
The Project-specific analysis provided in this report assesses whether the implementation of the proposed Project would have potentially significant noise impacts on existing residential uses adjacent to the Project Site.

1.1 Project Location

The 75.65-acre Project is located in Unincorporated County of Los Angeles (County), in the northeastern part of the Rowland Heights Community, California. The Project Site encompasses six non-contiguous parcels located both north and south of Colima Road, including Assessor Parcel Numbers (APNs) 8762-022-002, 8762-023-001, 8762-023-002, 8762-027-039, 8764-002-005, and 8764-002-006 (Los Angeles County Office of the Assessor, 2021), and located in the 20100 block of Colima Road, Rowland Heights, California 91789 (Project Site). The Project Site is separated by Colima Road, comprised of four parcels north of Colima Road, and two parcels south of Colima Road (**Figure 1**, *Project Location*, and **Figure 2**, *Project Vicinity*).

The Project Site is bounded by East Walnut Drive South on the north, Fairway Drive on the west, Colima Road and Shepherd Hills Drive on the south, and the residential neighborhoods along Tierra Luna, Calbourne Drive and Fairlance Drive to the east. The City of Diamond Bar is located immediately east of the Project Site, across Lots 4 and 5, where Colima Road becomes Golden Springs Drive. The City of Industry is north of the Project Site, north side of East Walnut Drive South and across State Route 60 (SR-60, or the Pomona Freeway).

The Project Site is near two major freeways. It is approximately 0.15-mile south of State Route 60 Freeway (SR-60, or Pomona Freeway), and approximately 1 mile west of State Route 57 Freeway (SR-57, or Orange Freeway). Regional access to the Project Site is from SR-60 and SR-57, with freeway exists at Fairway Drive and Golden Springs Drive (Figure 1). Primary arterial access is provided from Colima Drive, via Fairway Drive, which extends south of Colima Road as Brea Canyon Cutoff Road. East Walnut Drive South is the northern boundary of the Project Site (Figure 2). Major arterial access to the Project Site is provided by Valley Boulevard in the City of Industry from the north and Grand Avenue in the City of Diamond Bar from the east.



SOURCE: ESRI

Royal Vista Residential Project

Figure 1
Project Location

ESA

SOURCE: Mapbox, 2020.

Royal Vista Residential Project

Figure 2
Project Vicinity

ESA

1.2 Surrounding Land Uses

The Project Site is located within a developed and urbanized area, and primary surrounding uses are shown on **Figure 2**. Single-family residential uses immediately surround the Project Site on all sides except the north. Commercial and hotel uses are located to the north, along East Walnut Drive South, including a Quality Inn and Suites, commercial offices, self-storage facility, a Los Angeles County maintenance facility, and associated surface parking lot. South of Colima Road, are the existing golf course, landscaping, and residential uses surrounding the southeastern edge of the Project Site. Land uses further north of the Project Site, between SR-60 (Pomona Freeway) and Valley Boulevard, include business parks and commercial uses such as, car wash, restaurants, dance studio, gas station, storage facilities, and several retail stores.

Proposed Planning Area 1 is bordered on the south by Colima Road, by the proposed Planning Area 2 to the north, by residential uses to the north and to the east, and the Royal Vista Golf Club clubhouse and surface parking lot to the west. Proposed Planning Area 2 is bordered by East Walnut Drive South on the north, residential uses to the east and west, and the proposed Planning Area 1 to the south. Proposed Planning Area 3 is bordered by East Walnut Drive South on the north, proposed Planning Area 2 to the west, residential uses and Iluso Avenue to the south and a single family home to the east. Proposed Planning Area 4 is bordered by Colima Road to the south, and residential uses to the north, east, and west. Proposed Planning Area 5 is bordered on the north by Colima Road, by residential uses to the west, east and south. Proposed Planning Area 6 is bordered by residential single-family homes on the north and south, Walnut Leaf Drive to the east, and the Royal Vista Golf Club to the west.

1.3 Existing Conditions

The Project Site consists of portions of the existing Royal Vista Golf Club, which was established in 1963, and the Project Site is comprised of six irregularly-shaped and non-contiguous parcels. The proposed Project generally comprises 13 holes and the driving range of the existing 27-hole Royal Vista Golf Club. There are no existing structures on the majority of the Project Site; however, APN 8762-022-002 includes a maintenance facility. The Project Site is not accessible to the public due to the nature of it being a private golf club, where a chain link fence forms a perimeter around the Project Site. A tall driving range safety fence along the north side of Colima Road and security lighting are also present on the Project Site.

1.4 Project Description

The Project proposes to redevelop an approximately 75.65-acre site, which currently comprises a portion of the existing Royal Vista Golf Club golf course, with residential and open space. The Project would develop a total of 360 residential units, consisting of 200 detached single-family homes, 88 attached residential units (58 duplex units, 30 triplex units) and 72 townhomes. All 72 townhomes and ten triplex units would be set-aside for sale to middle to moderate-income households. The Project would also include approximately 28 acres of open space areas.

The Project would establish six planning areas, consisting of four residential planning areas (Planning Areas 1, 2, 3, and 5) and two recreational/open space planning areas (Planning Areas 4

and 6). Residential Planning Areas 1, 2, and 5 would include the 200 detached single-family residential (SFR) homes the 88 duplex and triplex units, of which 10 triplex units will be set-aside for sale to middle to moderate-income households. Residential Planning Area 3 would include the 72 townhouse units, all of which would be set-aside for sale to middle to moderate-income households. With 72 townhome units and 10 triplex units set-aside for sale to middle to moderate-income households, there will be a total of 82 units set-aside for sale to middle to moderate-income households which equals 22.7 percent of the Project's 360 units.

Planning Areas 4 and 6 would include proposed open space. Each residential planning area (Planning Areas 1, 2, 3 and 5) would include open space buffers with public-use recreational trails to facilitate pedestrian and bicycle circulation / connections between the Project's residential components, proposed open space, and the adjacent existing residential neighborhoods.

1.5 Construction

Construction of the proposed Project would be implemented over multiple phases: (1) demolition and removal of all identified buildings, structures, and existing landscaping on the Project Site; (2) site preparation; (3) grading and excavation; (4) drainage/utilities/trenching; (5) foundations/concrete pour; (6) building construction; (7) paving; and (8) architectural coating.

Building demolition of existing structures, infrastructure construction, and remedial grading would occur within the Project Site.

Project grading will require approximately 387,100 cubic yards of cut and approximately 253,400 cubic yards of fill, with a net export of approximately 133,700 cubic yards for the Project Site. Over excavation and re-compaction of up to 1,544,500 cubic yards each is anticipated. The maximum depth of excavation within the Project Site would be approximately 25 feet in areas where fill was deposited during the construction of the golf course. During Project excavation the 1,544,500 cubic yards would be temporarily stockpiled on site and when the site is ready for re-compaction, the 1,544,500 cubic yards soil would be redistributed on site and compacted to create roadways and the residential lots (Project grading plus over-excavation, re-compaction and export totals approximately 3,863,200 cubic yards).[1] Export materials will be hauled to the closest landfill, which is expected to be the Olinda Landfill in the City of Brea. The haul route is expected to be the SR-60 Freeway East from the Project Site using Colima Road and Fairway Avenue, to the SR-57 Freeway South, and then exiting at Lambert Road (approximately ten miles away).

Estimated start of construction is Fourth Quarter of 2024 with estimated completion in the Fourth Quarter of 2027.

There two off-site improvements which are the widening of East Walnut Drive South (southern half of the roadway) along the full length of the northern project boundary, and a traffic light to be installed on Colima, near the east end of the Project Site.

[1] Cut and fill, over-excavation and export grading quantities are rounded up and may differ slightly from quantities used for the tentative tract map review and air quality modeling assumptions.

2.0 Noise Impact Study

2.1 Fundamentals of Noise

2.1.1 Noise Principles and Descriptors

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air). Noise is generally defined as unwanted sound (i.e., loud, unexpected, or annoying sound). Acoustics is defined as the physics of sound. In acoustics, the fundamental scientific model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions, or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver.

Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) that is measured in decibels (dB), which is the standard unit of sound amplitude measurement. The dB scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound, with 0 dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of feeling and pain, respectively. Pressure waves traveling through air exert a force registered by the human ear as sound.[2]

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude, with audible frequencies of the sound spectrum ranging from 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.[3] The typical human ear is not equally sensitive to this frequency range. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that deemphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to these extremely low and extremely high frequencies. This method of frequency filtering, or weighting, is referred to as A-weighting, expressed in units of A-weighted decibels (dBA), which is typically applied to community noise measurements.[4] Some representative common outdoor and indoor noise sources and their corresponding A-weighted noise levels are shown in **Figure 3**.

2.1.2 Noise Exposure and Community Noise

An individual's noise exposure is a measure of noise over a period of time; a noise level is a measure of noise at a given instant in time, as presented Figure 3. However, noise levels rarely persist at one level over a long period of time. Rather, community noise varies continuously over a period of time with respect to the sound sources contributing to the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with many of the individual contributors

2 M. David Egan, *Architectural Acoustics* (1988), Chapter 1.
3 M. David Egan, *Architectural Acoustics* (1988), Chapter 1.
4 M. David Egan, *Architectural Acoustics* (1988), Chapter 1.

unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources, such as changes in traffic volume. What makes community noise variable throughout a day, besides the slowly changing background noise, is the addition of short-duration, single-event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual.[5]

These successive additions of sound to the community noise environment change the community noise level from instant to instant, requiring the noise exposure to be measured over periods of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. The following noise descriptors are used to characterize environmental noise levels over time, which are applicable to the Project.[6]

L_{eq}: The equivalent sound level, is used to describe noise over a specified period of time in terms of a single numerical value; the L_{eq} of a time-varying signal and that of a steady signal are the same if they deliver the same acoustic energy over a given time. The L_{eq} may also be referred to as the average sound level.

L_{max}: The maximum, instantaneous noise level experienced during a given period of time.

L_{min}: The minimum, instantaneous noise level experienced during a given period of time.

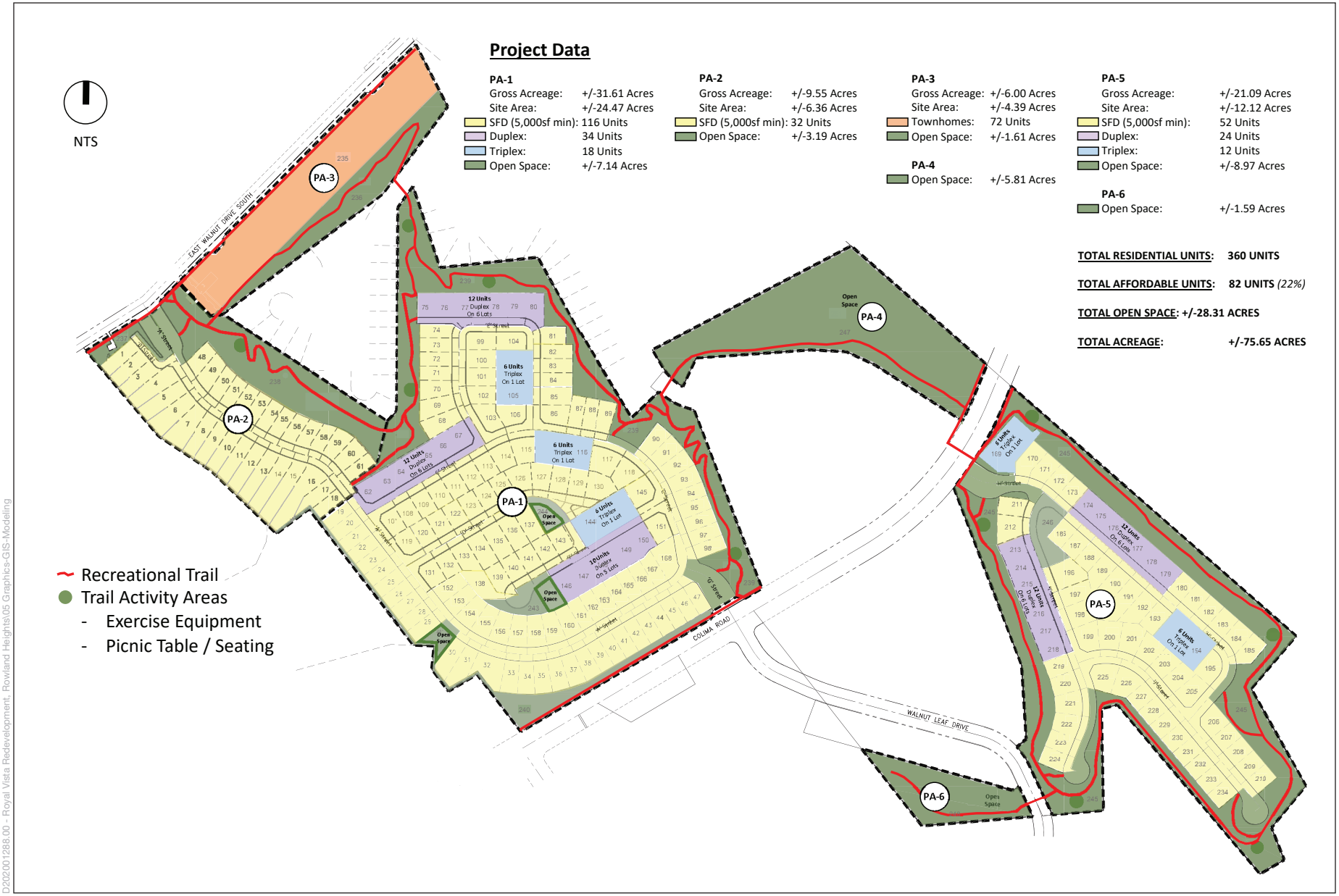
L_x: The noise level exceeded a percentage of a specified time period. For instance, L_{50} and L_{90} represent the noise levels that are exceeded 50 percent and 90 percent of the time, respectively.

L_{dn}: The average A-weighted noise level during a 24-hour day, obtained after an addition of 10 dB to measured noise levels between the hours of 10 p.m. to 7 a.m. to account nighttime noise sensitivity. The L_{dn} is also termed the day-night average noise level (DNL).

CNEL: The Community Noise Equivalent Level (CNEL) is the average A-weighted noise level during a 24-hour day that is obtained after an addition of 5 dB to measured noise levels between the hours of 7 p.m. to 10 p.m. and after an addition of 10 dB to noise levels between the hours of 10 p.m. to 7 a.m. to account for noise sensitivity in the evening and nighttime, respectively. CNEL and L_{dn} are close to each other, with CNEL being more stringent and generally 1 dB higher than L_{dn}.

5 California Department of Transportation, *Technical Noise Supplement (TeNS)* (September 2013), Section 2.2.2.1.

6 California Department of Transportation, *Technical Noise Supplement (TeNS)* (September 2013), Section 2.2.2.2.



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SOURCE: KTGY, 2023

Royal Vista Residential Project

Figure 3
Conceptual Site Plan

ESA

2.1.3 Effects of Noise on People

Noise is generally loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity that is a nuisance, or disruptive. The effects of noise on people can be placed into four general categories:

- Subjective effects (e.g., dissatisfaction, annoyance);
- Interference effects (e.g., communication, sleep, and learning interference);
- Physiological effects (e.g., startle response); and
- Physical effects (e.g., hearing loss).

Although exposure to high noise levels has been demonstrated to cause physical and physiological effects, the principal human responses to typical environmental noise exposure are related to subjective effects and interference with activities. Interference effects interrupt daily activities and include interference with human communication activities, such as normal conversations, watching television, telephone conversations, and interference with sleep. Sleep interference effects can include both awakening and arousal to a lesser state of sleep.[7]

With regard to the subjective effects, the responses of individuals to similar noise events are diverse and influenced by many factors, including the type of noise, the perceived importance of the noise, the appropriateness of the noise to the setting, the duration of the noise, the time of day and the type of activity during which the noise occurs, and individual noise sensitivity. Overall, there is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction on people. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise. Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted (i.e., comparison to the ambient noise environment). In general, the more a new noise level exceeds the previously existing ambient noise level, the less acceptable the new noise level will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships generally occur:[8]

- Except in carefully controlled laboratory experiments, a change of 1 dBA in ambient noise levels cannot be perceived;
- Outside of the laboratory, a 3 dBA change in ambient noise levels is considered to be a barely perceivable difference;
- A change in ambient noise levels of 5 dBA is considered to be a readily perceivable difference; and
- A change in ambient noise levels of 10 dBA is subjectively heard as doubling of the perceived loudness.

7 California Department of Transportation, *Technical Noise Supplement (TeNS)* (September 2013), Section 2.2.1.
8 California Department of Transportation, *Technical Noise Supplement (TeNS)* (September 2013), Section 2.2.1.

These relationships occur in part because of the logarithmic nature of sound and the decibel scale. The human ear perceives sound in a non-linear fashion; therefore, the dBA scale was developed. Because the dBA scale is based on logarithms, two noise sources do not combine in a simple additive fashion, but rather logarithmically. Under the dBA scale, a doubling of sound energy corresponds to a 3 dBA increase. In other words, when two sources are each producing sound of the same loudness, the resulting sound level at a given distance would be approximately 3 dBA higher than one of the sources under the same conditions. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA. Three sources of equal loudness together produce a sound level of approximately 5 dBA louder than one source, and 10 sources of equal loudness together produce a sound level of approximately 10 dBA louder than the single source.[9]

2.1.4 Noise Attenuation

When noise propagates over a distance, the noise level reduces with distance depending on the type of noise source and the propagation path. Noise from a localized source (i.e., point source) propagates uniformly outward in a spherical pattern, referred to as "spherical spreading." Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (i.e., reduce) at a rate between 6 dBA for acoustically "hard" sites and 7.5 dBA for "soft" sites for each doubling of distance from the reference measurement, as their energy is continuously spread out over a spherical surface (e.g., for hard surfaces, 80 dBA at 50 feet attenuates to 74 at 100 feet, 68 dBA at 200 feet, etc.). Hard sites are those with a reflective surface between the source and the receiver, such as asphalt, or concrete, surfaces, or smooth bodies of water. No excess ground attenuation is assumed for hard sites and the reduction in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source. Soft sites have an absorptive ground surface, such as soft dirt, grass, or scattered bushes and trees, which in addition to geometric spreading, provides an excess ground attenuation value of 1.5 dBA (per doubling distance).[10]

Roadways and highways consist of several localized noise sources on a defined path, and hence are treated as "line" sources, which approximate the effect of several point sources. Noise from a line source propagates over a cylindrical surface, often referred to as "cylindrical spreading."[11] Line sources (e.g., traffic noise from vehicles) attenuate at a rate between 3 dBA for hard sites and 4.5 dBA for soft sites for each doubling of distance from the reference measurement.[12] Therefore, noise due to a line source attenuates less with distance than that of a point source with increased distance.

Additionally, receptors located downwind from a noise source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Atmospheric temperature inversion (i.e., increasing temperature with elevation) can increase sound levels at long distances (e.g., more than 500 feet). Other factors such as air temperature, humidity, and turbulence can also have significant effects on noise levels.[13]

9 California Department of Transportation, *Technical Noise Supplement (TeNS)* (September 2013), Section 2.2.1.1.
10 California Department of Transportation, *Technical Noise Supplement (TeNS)* (September 2013), Section 2.1.4.2.
11 California Department of Transportation, *Technical Noise Supplement (TeNS)* (September 2013), Section 2.1.4.1.
12 California Department of Transportation, *Technical Noise Supplement (TeNS)* (September 2013), Section 2.1.4.1.
13 California Department of Transportation, *Technical Noise Supplement (TeNS)* (September 2013), Section 2.1.4.3.

A barrier will typically provide at least a 5 dBA noise reduction when it just breaks the line of sight between a noise source and a receiver, and additional noise reduction is achieved with increased height of the barrier and/or with the use of sound absorbing material (e.g.,, sound blankets on the noise source side of the barrier).[14]

2.2 Existing Conditions

Some land uses are considered more sensitive to noise than others, due to the types of activities of the land use requiring quiet. Noise-sensitive zones are any areas designated with specific noise restrictions for the purpose of ensuring exceptional quiet (Los Angeles County Code [LACC] Section 12.08.260) and includes those areas having residential or semi-residential/commercial land uses, as well as zones designated by the Director of the County's Department of Public Health, provided that conspicuous signs are displayed near the institution or facility indicating the presence of the zone. These noise-sensitive uses are also sensitive to vibration impacts when they are close to a project construction area. Existing noise-sensitive uses within 500 feet of the Project Site, which is the distance at which noise would not be discernable originating from the Project Site[15], generally include the following:

- To the south: Residential uses along the south side of Colima Road;
- To the west: Residential uses near Fairway Drive;
- To the east: Residential uses along the north and south sides of Colima Road.

All other receptors at greater distances than those identified above would experience lower noise levels.

2.2.1 Ambient Noise Levels

Noise Measurements

The predominant existing noise source on the Project Site and surrounding areas is traffic noise from State Route 60 (SR-60) and local streets.

To establish baseline noise conditions representing the nearby noise sensitive land uses in the vicinity of the Project Site, existing ambient noise levels measurements were conducted on March 18, 2021 at six locations on the Project Site. **Figure 4,** *Ambient Noise Measurement Locations*, shows the locations of the noise measurements, labeled as R1 through R6, as described as follows:

- R1 - on the northern Project Site boundary (south side of Planning Area 3), adjacent to residential uses and SR-60;
- R2 - in the middle of the western parcel (eastern side of Planning Area 1), between the Project Site and residences on the north side of Colima Road;
- R3 – on the northern Project Site boundary (north side of Planning Area 4), between the Project Site and residences north of Colima Road;

[14] Federal Highway Administration (FHWA), *Highway Noise Barrier Design Handbook*, 2000.
[15] California Department of Transportation, Technical Noise Supplement *(TeNS),* September 2013.

- R4 – on the southeastern Project Site boundary (Planning Area 5), between the Project Site and residences south of Colima Road;
- R5 – on the southern Project Site boundary (Planning Area 6), between the Project Site and residences to the south of Colima Road;
- R6 – to the south of the Project Site across Colima Road, between the Project Site/Colima Road and residences to the south of Colima Road.

Short-term (15-minute) noise measurements were conducted at each of the measurement locations to characterize the existing noise environment at the Project Site. Measured noise levels at the Project Site represent typical noise levels expected in a suburban, mostly residential, environment. The predominant existing noise source observed was vehicle traffic noise from the roadways surrounding the Project Site, as evidenced by the measured noise levels at R1 (near SR-60) and R6 (near Colima Road). Other noise measurement sites are away from major roadways and the measured noise levels are much lower than these two sites. Secondary noise sources observed included general residential-related activities, such as landscaping and refuse service activities, and intermittent aircraft flyovers. **Table 1,** *Summary of Short-Term Ambient Noise Measurements*, lists the measured ambient noise levels at the Project Site.

TABLE 1
SUMMARY OF SHORT-TERM AMBIENT NOISE MEASUREMENTS

Measurement Locations and Land Uses	Noise Level (dBA L_{eq}) [a]
R1, Residential Uses (in the vicinity of Iluso Avenue and Tierra Luna	62.1
R2, Residential Uses (in the vicinity of Tierra Siesta and Tierra Cima Avenue)	49.9
R3, Residential Uses (in the vicinity of Padrino Avenue, Ahtena Drive, and Calbourne Drive)	48.0
R4, Residential Uses (in the vicinity of Morning Sun Avenue)	46.9
R5, Residential Uses (in the vicinity of Walnut Leaf Drive)	44.6
R6, Residential Uses (in the vicinity of Colima Road, Lake Canyon Drive, and Emerald Meadow Drive)	61.1

[a] Detailed measured noise data is included in Appendix A. The ambient noise measurements were conducted using Larson Davis's model 820 Precision Integrated Sound Level Meter (SLM), which is a Type 1 standard instrument, as defined in the American National Standard Institute S1.4. The SLM was within its annual factory calibration, field calibrated prior to conducting measurements, and operated according to the applicable manufacturer specification. The microphone of the SLM was placed at a height of five feet above the local grade, representing an average height of the human ear.

SOURCE: ESA, 2021.

The ambient noise measurements were conducted using the Larson-Davis 820 Precision Integrated Sound Level Meter (SLM). The Larson-Davis 820 SLM is a Type 1 standard instrument as defined in the American National Standard Institute S1.4. All instruments were calibrated and operated according to the applicable manufacturer specification. The microphone was placed at a height of five feet above the local grade, which is the average height of a receptor.

SOURCE: ESA, 2022.

Royal Vista Residential Project

Figure 4
Noise Measurement Locations

ESA

Existing Roadway Noise Levels

The Royal Vista Residential and Parks Project Transportation Impact Analysis (Traffic Study), prepared by Linscott, Law, & Greenspan Engineers (LLG), analyzed 10 key intersections in the vicinity of the Project Site (Appendix M of this Draft EIR). Based on vehicle turning movement data provided in the Traffic Study for studied intersections, existing vehicle traffic noise levels were calculated for 10 roadway segments. The roadway segments selected for analysis are considered to be those that are expected to be the most directly affected by Project-related traffic, which, for the purpose of this analysis, include the roadways that are located near and lead to the Project Site. These roadways, when compared to roadways located at a greater distance from the Project Site, would experience the greatest percentage increase in traffic generated by the Project (as distances are increased from the Project Site, traffic is spread out over a greater geographic area and its effects are reduced).

Existing traffic noise levels were calculated using the California Department of Transportation (Caltrans) Technical Noise Supplement (TeNS) method based on the roadway traffic volume data and traffic volumes at the study intersections analyzed in the Traffic Study. The model calculates the average traffic noise levels at specific locations based on traffic volumes, average speeds, and site environmental conditions. The average daily noise levels under existing conditions along these roadway segments are presented in **Table 2,** *Traffic Noise Existing conditions.*

TABLE 2
TRAFFIC NOISE EXISTING CONDITIONS

	Existing CNEL (dBA) at Referenced Distances from Roadway Right-of-Way
Roadway Segment	**Existing**
Brea Canyon Cutoff Rd	
s/o Pathfinder Rd	73.5
Colima Rd	
between Fairway Dr and Lake Canyon Dr	72.9
between Lake Canyon Dr and Walnut Leaf Dr	72.7
between Tierra Luna and S Lemon Ave	72.8
between Walnut Leaf Dr and Tierra Luna	72.6
w/o Fairway Dr/Brea Canyon Cutoff Rd	73.1
East Walnut Dr South	
between Fairway Dr and Brookdale Walnut Entryway	60.8
e/o Fairway Dr	60.8
w/o Fairway Dr	60.8
Fairway Dr	
between East Walnut Dr South and Colima Rd	72.9
between SR-60 Eastbound Off Ramp and East Walnut Dr South	73.6
between SR-60 Westbound On/Off Ramp and SR-60 Eastbound Off Ramp	72.4
n/o SR-60 Westbound On/Off Ramp	70.5

Roadway Segment	Existing CNEL (dBA) at Referenced Distances from Roadway Right-of-Way Existing
between Colima Rd and Pathfinder Rd	72.9
Golden Springs Dr	
e/o S Lemon Ave	70.1
Pathfinder Rd	
e/o Brea Canyon Cutoff Rd	70.6
w/o Brea Canyon Cutoff Rd	71.9
S Lemon Ave	
n/o Golden Springs Dr	71.6
s/o Golden Springs Dr	61.9
SR-60 Eastbound Off Ramp	
w/o Fairway Dr	69.5
SR-60 Westbound On/Off Ramp	
e/o Fairway Dr	68.4
w/o Fairway Dr	67.3
Tierra Luna	
n/o Colima Rd	54.4
Walnut Leaf Dr	
s/o Colima Rd	55.9

SOURCE: ESA 2022; Linscott, Law & Greenspan, 2022.

2.3 Regulatory Setting

A number of statutes, regulations, plans, and policies that address noise concerns have been adopted. Below is a discussion of the relevant regulatory setting and noise regulations, plans, and policies.

2.3.1 State

California Code of Regulations (CCR) Title 24 establishes the California Building Code (CBC). The most recent building standard adopted by the legislature and used throughout the state is the 2019 version, which took effect on January 1, 2020. The State of California's noise insulation standards are codified in the CBC (Title 24, Part 2, Chapter 12). These noise standards are for new construction in California for the purposes of interior compatibility with exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residences, schools, or hospitals, are near major transportation noises, and where such noise sources create an exterior noise level of 60 dBA CNEL, or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new residential buildings, schools, and hospitals, the acceptable interior noise limit for new construction is 45 dBA CNEL.

The State of California does not have statewide standards for environmental noise, but the California Department of Health Services (DHS) has established guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. The purpose of these guidelines is to maintain acceptable noise levels in a community setting for different land use types. Noise compatibility by different land uses types is categorized into four general levels: "normally acceptable," "conditionally acceptable," "normally unacceptable," and "clearly unacceptable." For instance, a noise environment ranging from 50 dBA CNEL to 65 dBA CNEL is considered to be "normally acceptable" for multi-family residential uses, while a noise environment of 75 dBA CNEL or above for multi-family residential uses is considered to be "clearly unacceptable." In addition, California Government Code Section 65302(f) requires each county and city in the State to prepare and adopt a comprehensive long-range general plan for its physical development, with Section 65302(g) requiring a noise element to be included in the general plan. The noise element must: (1) identify and appraise noise problems in the community; (2) recognize Office of Noise Control guidelines; and (3) analyze and quantify current and projected noise levels.

2.3.2 Local

The proposed Project is located within the unincorporated County of Los Angeles near the community of Rowland Heights. Applicable County of Los Angeles noise standards and policies are described below.

County of Los Angeles

Los Angeles County General Plan Noise Element

The Los Angeles County General Plan Noise Element was established as a planning tool to develop strategies and action programs that address the multitude of noise sources and issues throughout the County. The County's Noise Element primarily addresses transportation noise sources, such as traffic, railroad, and aircraft noise. The guidelines used by the County are based on the community noise compatibility guidelines established by the California DHS, and are provided in **Table 3,** *Land Use Compatibility for Community Noise*. Specific regulations that implement these guidelines are set forth in the Los Angeles County Code, as discussed below.

With respect to these standards, changes in noise levels of less than 3 dBA are generally not discernible to most people, while changes greater than 5 dBA are readily noticeable and would be considered a significant increase. Therefore, the significance threshold for mobile source noise is based on human perceptibility to changes in noise levels (increases), with consideration of existing ambient noise conditions and the County's land use noise compatibility guidelines.

TABLE 3
LAND USE COMPATIBILITY FOR COMMUNITY NOISE
(CALIFORNIA DEPARTMENT OF PUBLIC HEALTH CRITERIA)

	Community Noise Exposure CNEL, dBA			
Land Use	**Normally Acceptable**	**Conditionally Acceptable**	**Normally Unacceptable**	**Clearly Unacceptable**
Single-Family, Duplex, Mobile Homes	50 to 60	55 to 70	70 to 75	Above 75
Multi-Family Homes	50 to 65	60 to 70	70 to 75	Above 75
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 to 70	60 to 70	70 to 80	Above 80
Transient Lodging—Motels, Hotels	50 to 65	60 to 70	70 to 80	Above 80
Auditoriums, Concert Halls, Amphitheaters	—	50 to 70	—	Above 65
Sports Arena, Outdoor Spectator Sports	—	50 to 75	—	Above 70
Playgrounds, Neighborhood Parks	50 to 70	—	67 to 75	Above 72
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 to 75	—	70 to 80	Above 80
Office Buildings, Business and Professional Commercial	50 to 70	67 to 77	Above 75	—
Industrial, Manufacturing, Utilities, Agriculture	50 to 75	70 to 80	Above 75	—

Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Clearly Unacceptable: New construction or development should generally not be undertaken.

SOURCE: State of California, General Plan Guidelines, Governor's Office of Planning and Research, 2003.

Los Angeles County Code Noise Ordinance

The County of Los Angeles Noise Restrictions are provided in Chapter 12.08, Noise Control of the Los Angeles County Code (LACC). Chapter 12.08 provides procedures and criteria for the measurement of the sound level of "offending" noise sources.

The LACC outlines exterior noise standards for four noise zones based on land use type: noise-sensitive areas, residential properties, commercial properties, and industrial properties. The County's maximum exterior noise standards set forth in LACC Section 12.08.390 are provided in **Table 4,** *Los Angeles County Presumed Ambient Noise Levels*. For residential-zoned areas, the presumed ambient noise level is 50 dBA during the daytime and 45 dBA during the nighttime. The following standards are used to evaluate compliance:

- Standard No. 1: Exterior noise cannot exceed levels set forth in Table 3 for a cumulative period of more than 30 minutes in any hour.
- Standard No. 2: Exterior noise cannot exceed levels set forth in Table 3 plus 5 dBA for a cumulative period of more than 15 minutes in any hour.

- Standard No. 3: Exterior noise cannot exceed levels set forth in Table 3 plus 10 dBA for a cumulative period of more than 5 minutes in any hour.
- Standard No. 4: Exterior noise cannot exceed levels set forth in Table 3 plus 15 dBA for a cumulative period of more than one minute in any hour.
- Standard No. 5: Exterior noise cannot exceed levels set forth in Table 3 plus 20 dBA at any time.

TABLE 4
LOS ANGELES COUNTY PRESUMED AMBIENT NOISE LEVELS

Noise Zone	Zone	Daytime Hours (7 a.m. to 10 p.m.) dBA (L_{eq})	Nighttime Hours (10 p.m. to 7 a.m.) dBA (L_{eq})
I	Noise-sensitive area	45	45
II	Residential	50	45
III	Commercial	60	55
IV	Industrial	70	70

SOURCE: LACC , Section 12.08.390.

If ambient noise levels exceed the exterior noise levels in Table 3, then the aforementioned standards can be adjusted by substituting relevant noise levels in Table 3 with the following ambient measurements:

- Standard No. 6: Ambient L_{50}, the noise level exceeded 50% of the time over an hour period.
- Standard No. 7: Ambient L_{25}, the noise level exceeded 25% of the time over an hour period.
- Standard No. 8: Ambient $L_{8.3}$, the noise level exceeded 8.3% of the time over an hour period.
- Standard No. 9: Ambient $L_{1.7}$, the noise level exceeded 1.7% of the time over an hour period.
- Standard No. 10: Ambient L_0, the maximum noise level over an hour period.

LACC Section 12.08.440 prohibits construction between the hours of 7:00 P.M. and 7:00 A.M. and at any time on Sundays or holidays, if it creates a noise disturbance across a residential or commercial real-property line. **Table 5,** *Los Angeles County Permissible Construction Equipment Noise at Receptor***,** outlines the maximum noise levels permissible by construction equipment at affected buildings depending on land use. These noise thresholds pertain to two timeframes: daytime hours from 7:00 A.M. to 8:00 P.M. daily (except Sundays and holidays) and nighttime hours from 8:00 P.M. to 7:00 A.M. daily (or all day Sundays and holidays).

The County Noise Ordinance states that noise levels caused by any air-conditioning or refrigeration equipment shall not exceed the levels identified in **Table 6,** *County of Los Angeles Residential Air-Conditioning and Refrigeration Equipment Standards.*

TABLE 5
LOS ANGELES COUNTY PERMISSIBLE CONSTRUCTION EQUIPMENT NOISE AT RECEPTOR

Equipment Type	Receptor Type	Daytime Hours (7 a.m. to 8 p.m.) dBA (L_{eq})	Nighttime Hours (8 p.m. to 7 a.m.) dBA (L_{eq})
Mobile Short-term operation (less than 10 days)	Single-family Residential	75	60
	Multi-family Residential	80	64
	Semi-residential/Commercial	85	70
	Business Structures	85	85
Stationary Long-term operation (more than 10 days)	Single-family Residential	60	50
	Multi-family Residential	65	55
	Semi-residential/Commercial	70	60

SOURCE: LACC , Section 12.08.440.

TABLE 6
COUNTY OF LOS ANGELES RESIDENTIAL AIR-CONDITIONING AND REFRIGERATION EQUIPMENT STANDARDS

Measurement Location	Units Installed Before 1-1-80 dBA	Units Installed On or After 1-1-80 dBA
Any point on neighboring property line, 5 feet above grade level, no closer than 3 feet from any wall.	60	55
Center of neighboring patio, 5 feet above grade level, no closer than 3 feet from any wall.	55	50
Outside the neighboring living area window nearest the equipment location, not more than 3 feet from the window opening, but at least 3 feet from any other surface.	55	50

SOURCE: County of Los Angeles Ordinance, No. 11743, LACC, Section 12.08.530.

2.4 Thresholds of Significance

Pursuant to *State CEQA Guidelines* Appendix G, the Project would result in a significant impact related to noise if it would expose people to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

For the purposes of this analysis and consistency with *State CEQA Guidelines* Appendix G, applicable local plans, and agency and professional standards, the Project would have a significant impact to noise and/or ground-borne vibration if it would:

a. Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

b. Generate excessive ground-borne vibration or ground-borne noise levels; or

c. Expose people residing or working in the project area to excessive noise levels (for a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport).

Item a. presented above is qualitative and does not provide specific guidance regarding noise impact determinations. Given the Project's location on County-owned land, the quantitative thresholds discussed below in Subsections 2.4.1 and 2.4.2 for noise have been established based on County Code and standard practice and are described in more detail below.

Similarly, item b. presented above is qualitative and does not provide specific guidance regarding vibration impact determinations. Vibration is discussed later in this report in Section 3.0 and the quantitative thresholds for vibration are discussed in Subsection 3.2.

The Project Site is not located within the vicinity of an airport or air strip, and therefore would not result in any impacts pertaining to airport land use plans, airports, or private airstrips; therefore, item c. does not require further analysis in this study.

2.4.1 Construction Noise

Consistent with provisions of the LACC as described above, the Project construction period would have a duration of more than 10 days and would not occur between the hours of 7:00 p.m. and 7:00 a.m. Monday through Saturday, or at any time on Sundays and holidays. As shown above in Table 5, construction activities lasting more than 10 days would result in a significant noise impact should mobile on-site construction activities, between 7:00 a.m. and 8:00 p.m., exceed the applicable noise threshold established by the LACC of 75 dBA L_{eq} at single-family residences and mobile homes, 80 dBA L_{eq} at multi-family residences, or 85 dBA L_{eq} at semi-residential/commercial land uses.

Off-site construction roadway noise impacts would be considered significant if Project construction traffic noise would exceed 75 dBA L_{eq} at single-family residences and mobile homes, 80 dBA L_{eq} at multi-family residences, or 85 dBA L_{eq} at semi-residential/commercial land uses. However, construction traffic, especially haul trucks, is intermittent and would not occur continuously over any 1-hour period, it is usually not sufficient to cause such traffic noise impacts. To assess it quantitatively, if Project-related construction traffic would not result in a 3 dBA increase over the existing baseline conditions, it would be considered a less than significant impact.

Based on the Federal Highway Administration (FHWA) Highway Construction Noise Handbook (FHWA, August 2006), a substantial temporary increase in ambient noise levels due to on-site construction activity would occur if construction noise would result in a 10 dBA or greater increase in ambient noise, which is perceived by the healthy human ear as a doubling of noise. Impacts would be significant if construction noise would result in a 10 dBA or greater increase in ambient noise.

2.4.2 Operational Noise

Vehicle traffic noise during Project operation would have a significant noise impact if it would increase existing ambient noise levels (i.e., noise levels without Project traffic) by 5 dBA CNEL or more at a sensitive land use currently experiencing "normally acceptable" or "conditionally

acceptable" noise levels; or increase ambient noise levels by 3 dBA CNEL or more at a sensitive land use currently experiencing "normally unacceptable" or "clearly unacceptable" noise levels.[16]

On-site stationary sources operational noise, such as noise associated with building mechanical HVAC equipment or recreational/open space activity, would result in a significant impact if noise levels would exceed the noise standards identified in Chapter 12.08, Noise Control of the Los Angeles County Code (LACC), 55 dBA L_{eq}, at a neighboring property line and be in violation of the County Noise Ordinance (see Table 4). With regard to increases in ambient noise, per the FHWA recommended guideline, impacts would be significant if mechanical equipment noise would result in a 10 dBA or greater increase in ambient noise.

2.5 Methodology

2.5.1 Construction On-Site Equipment Noise

On-site construction noise impacts were projected by determining the noise levels expected to be generated by the different types of construction activities anticipated, calculating the construction-related noise levels produced by the construction equipment assumed at sensitive receptors. More, specifically, the following steps were undertaken to assess construction-period noise impacts.

1. Ambient noise levels at surrounding sensitive receptor locations R1 through R6 were estimated based on field measurement data (see Table 1);
2. Typical noise levels for each type of construction equipment expected to be used based on information provided by the Applicant were obtained from the Federal Highway Administration (FHWA) roadway construction noise model (RCNM);
3. Distances between construction site locations (noise sources) within the Project Site and surrounding sensitive receptors were measured using Project architectural drawing, Google Earth, and site plans (See Chapter 2, *Project Description*, Figure 2-2, *Local Vicinity Map* of the Draft EIR);
4. The construction noise levels were then calculated for each construction phase using the FHWA RCNM, conservatively, in terms of hourly L_{eq}, for sensitive receptor locations based on the industry standard point source noise-distance attenuation factor of 6 dBA for each doubling of distance, assuming that all of the equipment for each construction phase would be in use concurrently and that the loudest equipment would be located at the edge of the Project Site closest to the sensitive receptor locations; and
5. Construction noise levels were then compared to the construction noise significance thresholds identified above in Section 2.4, *Thresholds of Significance*.

The analysis of construction noise incorporates conservative assumptions to provide an environmentally protective analysis that avoids underestimating construction noise levels. These conservative assumptions include (1) assuming all pieces of construction equipment anticipated to be used for the specific construction phases would be in use simultaneously; (2) assuming that several noisy equipment used during the various construction stages and construction activities would be located on the Project Site in the applicable construction work area for the construction

[16] Caltrans, Traffic Noise Analysis Protocol, May 2011.

activity at the closest distance to the sensitive receptor location, with other equipment spaced in other construction work areas; and (4) assuming the more conservative attenuation rate of 6 dBA per doubling of distance for acoustically "hard" sites (e.g., asphalt and concrete surfaces) instead of 7.5 dBA per doubling of distance for acoustically "soft" sites (e.g., soft dirt, grass or scattered bushes and trees).

2.5.2 Off-Site Roadway Noise (Construction and Operations)

Roadway CNEL noise levels were calculated using the methodology based on the Federal Highway Administration's (FHWA's) Highway Traffic Noise Model (TNM)[17] and traffic volumes at the study intersections reported in the Project's Transportation Impact Analysis prepared by LLG.[18]The modeling analysis calculates the noise level (in CNEL) along roadway segments based on traffic volumes, average speeds, and site environmental conditions. In addition, the Caltrans Technical Noise Supplement (TeNS) document states that the peak hour traffic noise level would be equivalent to the L_{dn} level based on the assumptions of (1) the peak hour traffic volume would be 10 percent of the average daily traffic volume, and (2) the split of daytime and nighttime average daily traffic volume is 85/15 percent.[19] Further, the CNEL level would be 0.3 dBA higher than L_{dn} level based on the assumption of 80 percent in daytime and 5 percent in evening time.

This method allows for the definition of roadway configurations, barrier information (if any), and receiver locations. Roadway noise attributable to Project development was calculated and compared to baseline noise levels that would occur under the "without Project" condition.

2.5.3 Stationary Point-Source Noise (Operations)

The Project's proposed residences would not generate any significant stationary source noise or result in any stationary source noise impacts. The operation of mechanical equipment that would be installed for the new residential uses, such as air conditioners, fans, and related equipment, may generate audible noise levels. The specific location of stationary equipment within the Project Site is not yet known. However, all outdoor mounted mechanical and electrical equipment would be designed to meet the requirements of County Code, Section 12.08.530.

The Project's proposed open space areas could generate noise from pedestrians and bicyclists using planned pedestrian and bicycle paths through the two planned open space areas. No special events or nighttime events are expected. Open space impacts are discussed qualitatively in the analysis below.

17 FHWA, Traffic Noise Model Version 2.5, 2004.

18 Linscott, Law & Greenspan, Engineers (LLG). 2022. Transportation Impact Analysis – Royal Vista Residential and Parks Project, November, 2022.

19 California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol* (September 2013). http://www.dot.ca.gov/hq/env/noise/pub/TeNS_Sept_2013B.pdf.

2.5.4 Off-Site Improvements Noise (Construction)

There two off-site improvements:

- the widening of East Walnut Drive South (southern half of the roadway) along the full length of the northern Project boundary, and
- a street light to be installed on Colima, near the east end of the Project Site.

Construction of these two off-site improvements would involve fewer pieces of equipment compared to on-site construction. Street widening would include site preparation and paving of asphalt. The southern half of East Walnut Drive South along the northern Project boundary is at a minimum 200 feet from the nearest residences along Tarta Court and Iluso Avenue. Installation of a street light may include the use of a crane at the intersection of Colima Road and Tierra Luna approximately 30 feet from residences.

2.5.5 Project Design Features

The Project would implement the following Project Design Feature as construction management practices:

PDF NOI-1: **Control of Construction Hours.** Construction activities occurring as part of the Project shall be subject to the limitations which states that construction activities may occur between 7:00 a.m. and 7:00 p.m. Mondays through Saturdays. No construction activities shall be permitted outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the Chief Building Official or his or her authorized representative.

2.6 Environmental Impacts

The Project would not result in the exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. ***(Less-than-Significant Impact)***

2.6.1 Project Construction

This section includes an overview of the typical methods, equipment, and work force that would be used for construction of the proposed Project. Unless otherwise noted, construction activities are anticipated to occur between the hours of 7:00 a.m. and 7:00 p.m., Monday through Saturday, consistent with the County of Los Angeles Noise Ordinance.

Short-term noise impacts would be associated with demolition, excavation, grading, paving, and underground construction during construction of the proposed Project. Construction-related short-term noise levels would be higher than existing ambient noise levels in the Project area today but would no longer occur once construction of the Project is completed.

Construction On-Site Equipment Noise

Construction of the Project would generate noise from the use of heavy-duty construction equipment on the Project Site. Construction is completed in discrete steps, each of which has its

own mix of equipment, and consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on the site, and therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. **Table 7,** *RCNM Default Noise Emission Reference Levels and Usage Factors*, lists typical construction equipment noise levels recommended for noise impact assessments, based on a distance of 50 feet between the equipment and a noise receptor, taken from the FHWA Roadway Construction Noise Model (RCNM) (FHWA 2006).

TABLE 7
RCNM DEFAULT NOISE EMISSION REFERENCE LEVELS AND USAGE FACTORS

Equipment Description	Impact Device?	Acoustical Usage Factor	Spec. 721.560 L_{max} at 50 Feet (dBA, slow)	Actual Measured L_{max} at 50 Feet (dBA, slow)
All other equipment >5 HP	No	50	85	N/A
Backhoe	No	40	80	78
Compressor (air)	No	40	80	78
Concrete saw	No	20	90	90
Crane	No	16	85	81
Dozer	No	40	85	82
Drill rig truck	No	20	84	79
Dump truck	No	40	84	76
Excavator	No	40	85	81
Frontend loader	No	40	80	79
Generator	No	50	82	81
Generator (<25 kVA, variable-message signs)	No	50	70	73
Grader	No	40	85	N/A
Jackhammer	Yes	20	85	89
Paver	No	50	85	77
Pumps	No	50	77	81
Roller	No	20	85	80
Scraper	No	40	85	84
Tractor	No	40	84	N/A
Vibratory pile driver	No	20	95	101
Welder/torch	No	40	73	74

SOURCE: Federal Highway Administration, *Roadway Construction Noise Model User's Guide* (2006), Table 1.
dBA = A-weighted decibels; HP = horsepower; N/A = not applicable

Project construction would constitute 8 work phases, as shown in **Table 8,** *Construction Noise in Each Construction Phase*. Individual pieces of heavy-duty off-road construction equipment that would be used for construction of the Project would generate maximum noise levels ranging from

73 dBA to 85 dBA L_{max} for the majority of the equipment types at a reference distance of 50 feet from the noise source, as shown in Table 8. A few types of heavy-duty off-road construction equipment could generate maximum noise levels above this range, which include a concrete saw at up to 90 dBA L_{max} and a vibratory pile driver at up to 95 dBA L_{max}. The construction equipment noise levels at a distance of 50 feet (Referenced Maximum Noise Levels) are based on the FHWA RCNM User's Guide,[20] which is a technical report containing actual measured noise data for construction equipment.

TABLE 8
CONSTRUCTION NOISE IN EACH CONSTRUCTION PHASE

Phase Name	Equipment Type/Number	Reference Maximum Noise for One Equipment at 50 feet, L_{max}	Aggregate Noise for All Equipment at 50 feet, L_{eq} (1-hour)[a]
Demolition	Tractor/Loader/Backhoe/2	80	79
	Concrete Saw/1	90	83
	Crawler Tractor/2	84	83
	Excavator/1	85	81
	Jackhammer/1	85	78
Site Preparation	Crawler Tractor/2	84	79
	Excavator/1	85	83
	Tractors/Loaders/Backhoes/2	80	81
Grading/Excavation	Tractors/Loaders/Backhoes/2	80	79
	Graders/1	85	81
	Drill Rig Truck/2	84	80
	Crawler Tractor/4	84	86
	Excavator/1	85	81
	Dump Truck/4	84	86
	Vibratory Pile Driver/2	95	91
	Pumps/1	77	74
	Scraper/6	85	89
	Dozer/1	85	81
Drainage / Utilities / Trenching	Excavator/2	85	84
	Grader/1	85	81
	Dozer/1	85	81
	Scraper/2	85	84
	Tractor/Loader/Backhoe/2	80	79
Foundations / Concrete Pour	Excavator/2	85	84
	Grader/1	85	81
	Dozer/1	85	81
	Scraper/2	85	84
	Tractor/Loader/Backhoe/2	80	79
Building Construction	Cranes/1	85	77
	Forklifts/3	75	70

[20] FHWA, Roadway Construction Noise Model, User's Guide, 2006.

Phase Name	Equipment Type/Number	Reference Maximum Noise for One Equipment at 50 feet, L_{max}	Aggregate Noise for All Equipment at 50 feet, L_{eq} (1-hour)[a]
	Generator/1	82	79
	Tractors/Loaders/Backhoes/3	80	81
	Welders/1	73	69
	Other Equipment/2	85	85
Paving	Paver/2	85	85
	Roller/2	85	81
Architectural Coating	Air Compressor/1	80	76

a Assuming construction equipment would operate with the usage factor listed in FHWA RCNM User's Guide, 2006 (see Table 6).
SOURCE: ESA, 2021

Table 8 also presents the noise levels from multiple pieces of equipment that would be used during the Project's construction activities. Because the decibel scale is logarithmic, two equal strength noise sources (e.g., 72 dBA and 72 dBA) combined together would result in a 3 dBA increase to result in 75 dBA from both noise sources.

The Project Site is located near residential neighborhoods, with residential homes surrounding the Project Site. **Table 9,** *Estimated Construction Noise Levels at Existing Off-Site Sensitive Receptors*, lists the estimated construction noise levels at the representative off-site sensitive uses where the ambient noise levels were taken. In addition, due to overlapping construction phases, the combined noise levels would be higher than the noise levels generated during each construction phase. The following are overlapping phases anticipated during Project construction:

- Drainage/Utilities/Trenching and Foundations/Concrete Pour
- Drainage/Utilities/Trenching and Building Construction
- Drainage/Utilities/Trenching and Paving Foundations/Concrete Pour and Building Construction
- Foundations/Concrete Pour and Paving
- Foundations/Concrete Pour and Architectural Coating
- Building Construction and Architectural Coating

As shown in Table 9, construction noise levels would exceed the thresholds of significance identified above for construction noise.

TABLE 9
ESTIMATED CONSTRUCTION NOISE LEVELS AT EXISTING OFF-SITE SENSITIVE RECEPTORS

Noise Sensitive Receptor	Construction Phases	Distance between Nearest Receptor and Construction Site, feet	Estimated Construction Noise Levels at Noise Sensitive Receptor by Construction Phase,[a] Hourly L_{eq} (dBA)
R1 Existing residences near the north Project boundary, along Iluso Avenue	Demolition	50 to 250 feet	85
	Site Preparation		83
	Grading/Excavation		85
	Drainage/Utilities/Trenching		85
	Foundations and Concrete Pour		86
	Building Construction		86
	Paving		82
	Architectural Coating		76
	Maximum Overlapping Noise Level		**89.0**[b] [b]
R2 Existing residences near the middle of the Project area, along Tierra Siesta and north of Colima Road	Demolition	50 to 500 feet	85
	Site Preparation		83
	Grading/Excavation		83
	Drainage/Utilities/Trenching		84
	Foundations and Concrete Pour		86
	Building Construction		86
	Paving		82
	Architectural Coating		76
	Maximum Overlapping Noise Level		**88.2**
R3 Existing residences near the northeast Project boundary, along Calbourne Drive	Demolition	50 to 250 feet	85
	Site Preparation		83
	Grading/Excavation		85
	Drainage/Utilities/Trenching		85
	Foundations and Concrete Pour		86
	Building Construction		86
	Paving		82
	Architectural Coating		76
	Maximum Overlapping Noise Level		**89.0**
R4 Existing residences near the southeast Project boundary, along Morning Sun Avenue	Demolition	50 to 500 feet	85
	Site Preparation		83
	Grading/Excavation		83
	Drainage/Utilities/Trenching		84
	Foundation and Concrete Pour		86
	Building Construction		86
	Paving		82
	Architectural Coating		76
	Maximum Overlapping Noise Level		**88.2**
R5 Existing residences near the middle of the Project Site, along Walnut Leaf Drive and south of Colima Road	Demolition	50 to 200 feet	86
	Site Preparation		83
	Grading/Excavation		86
	Drainage/Utilities/Trenching		85
	Foundation and Concrete Pour		86
	Building Construction		86
	Paving		83
	Architectural Coating		76
	Maximum Overlapping Noise Level		**89.5**

Noise Sensitive Receptor	Construction Phases	Distance between Nearest Receptor and Construction Site, feet	Estimated Construction Noise Levels at Noise Sensitive Receptor by Construction Phase,[a] Hourly L_{eq} (dBA)
R6	Demolition		79
Existing residences near the middle of the Project Site, along Emerald Meadow Drive and south of Colima Road	Site Preparation		77
	Grading/Excavation		79
	Drainage/Utilities/Trenching		79
	Foundation and Concrete Pour	100 to 600 feet	80
	Building Construction		80
	Paving		76
	Architectural Coating		70
	Maximum Overlapping Noise Level		**82.9**

a Estimated construction noise levels represent the worst-case condition when noise generators are located closest to the receptors and are expected to last the entire duration of each construction phase.
b Maximum overlapping noise levels combined noise levels from overlapping construction phases.
SOURCE: ESA, 2021.

As stated previously, sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. For a single point source, sound levels decrease approximately 6 dBA for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by stationary equipment. If noise is produced by a line source, such as highway traffic or railroad operations, the sound decreases 3 dBA for each doubling of distance in a hard site environment. Line source noise in a relatively flat environment with absorptive vegetation decreases 4.5 dBA for each doubling of distance. Existing residential uses that are located at 100 feet (-6 dBA relative to the noise level at 50 feet) from the Project Site boundary would receive a noise reduction of 6 dBA with the distance attenuation. However, noise reduction through distance attenuation requires a large buffer zone between the noise sources and sensitive receivers. It is not practical to establish a buffer zone for noise attenuation purposes when the sensitive receivers are located in close proximity of the construction areas. For example, when the noise sources generate a level of 84 dBA at a distance of 50 feet, it will take a distance of 800 feet to have a 24 dBA reduction to comply with a 60 dBA noise standard.

Construction noise is temporary and will cease to occur after completion of the Project construction. It is required that all construction, maintenance, or demolition activities within the County's boundary be limited to the hours between 7:00 a.m. and 7:00 p.m., Monday through Saturday. No construction work should occur on Sundays and federal holidays.

Construction on the Project Site would expose the nearest noise-sensitive uses in the Project vicinity to noise levels reaching up to 86.5 dBA L_{eq} over a period of one hour for the existing residences to the east and south in the Project vicinity during the overlapping construction phases. During each of the construction phases, noise associated with on-site activity would be lower than the combined noise levels during the overlapping periods.

Because construction on the Project Site would potentially expose adjacent residences to construction noise levels exceeding the County's significance threshold of 75 dBA for single family residences, which are the majority of the existing residences surrounding the Project Site, and would exceed the threshold of 10 dBA over ambient noise levels, temporary mitigation measures, including noise barriers with sufficient height to block the line-of-sight between the Project construction area and adjacent sensitive receiver, will be required during Project construction.

Off-Site Improvement Construction Noise

Construction of the Project's two off-site improvements would involve fewer pieces of equipment compared to the on-site construction. Street widening would include site preparation and paving of asphalt. The southern half of East Walnut Drive South along the northern Project boundary is at a minimum 150 feet from the nearest residences along Tarta Court and Iluso Avenue. **Table 10**, *Estimated Off-Site Construction Noise Levels at Existing Off-Site Sensitive Receptors – Street Widening*, shows the noise levels resulting from off-site street widening.

As shown in Table 10, street widening would not result in noise levels exceeding the County's 75 dBA noise standard for mobile source construction equipment noise at single-family residences. Nor would street widening construction activity result in increases of ambient noise levels greater than 10 dBA at sensitive receptor locations R1, which is the closest sensitive receptor to the off-site construction work. Due to the topography of the area where R1 is located. The elevation would create a direct line-of-sight between off-site construction activity and the sensitive receptor and a sound wall would be ineffective. Therefore, the only feasible Mitigation Measure is NOI-2, which would reduce noise levels by 3 dBA. As such, environmental impacts related to the temporary or periodic increase in ambient noise levels during street widening would be less than significant with mitigation.

A traffic signal at the Colima Road / Tierra Luna Intersection is proposed and the existing Colima Road golf cart crossing signal east of Tierra Luna would be removed. Installation of a traffic signal may include the use of a crane. **Table 11**, *Estimated Off-Site Construction Noise Levels at Existing Off-Site Sensitive Receptors – Traffic Signal*, shows the noise levels resulting from the installation of the traffic signal.

As shown in Table 11, noise levels from the crane used during traffic signal installation would result in noise levels exceeding the County's 75 dBA noise standard for mobile source construction equipment noise at single-family residences and impacts would potentially significant before mitigation. **Mitigation Measure NOI-3** would require use of a temporary mobile noise barrier to shield the body of the crane from the surrounding residential receptors. Most of the noise produced by a crane come from the internal combustion engine located in the body of the crane. The crane arm is powered by the engine in the body of the crane hence the arm is not the main source of noise from the crane. Therefore, a mobile noise barrier shielding the body of the crane from the receptors would result in a 12 dBA noise reduction which would reduce noise levels from traffic signal installation from 83 dBA L_{eq} to 71 dBA L_{eq} which would be below the County's threshold of 75 dBA.

TABLE 10
ESTIMATED OFF-SITE IMPROVEMENT CONSTRUCTION NOISE LEVELS AT EXISTING OFF-SITE SENSITIVE RECEPTORS – STREET WIDENING

Off-site Sensitive Land Uses	Existing Ambient Noise Levels (dBA L_{eq})	Estimated Construction Noise Levels - Unmitigated (dBA L_{eq}) [a]	Estimated Mitigation Measure Noise Levels Reductions (dBA L_{eq}) [b]	Estimated Construction Noise Levels - Mitigated (dBA L_{eq})	Combined Ambient Plus Mitigated Construction Noise Levels (dBA L_{eq})	Increase over Existing Ambient	Exceed Significance Threshold after Mitigation?
Existing residences near the north Project boundary, along Iluso Avenue and Tarta Court	62.1	74.0	-3.0	71.0	71.5	9.4	No

NOTE: Noise levels added logarithmically.

[a] The noise levels were estimated by including the assumption that there will be some Infrastructure phases overlap with the Building Construction phase.
[b] Mitigation noise levels include incorporation of Mitigation Measure NOI-2, accounting for a reduction of 3 dBA. .

SOURCE: ESA, 2022.

TABLE 11
ESTIMATED OFF-SITE IMPROVEMENT CONSTRUCTION NOISE LEVELS AT EXISTING OFF-SITE SENSITIVE RECEPTORS – TRAFFIC SIGNAL

Off-site Sensitive Land Uses	Existing Ambient Noise Levels (dBA L_{eq})	Estimated Construction Noise Levels - Unmitigated (dBA L_{eq}) [a]	Estimated Mitigation Measure Noise Levels Reductions (dBA L_{eq}) [b]	Estimated Construction Noise Levels - Mitigated (dBA L_{eq})	Combined Ambient Plus Mitigated Construction Noise Levels (dBA L_{eq})	Increase over Existing Ambient	Exceed Significance Threshold after Mitigation?
Existing residences near the intersection of Colima Road and Tierra Luna	49.9	83.0	-12.0	71.0	71.0	21.1	**Yes**

NOTE: Noise levels added logarithmically.

[a] The noise levels were estimated by including the assumption that there will be some Infrastructure phases overlap with the Building Construction phase.
[b] Mitigation noise levels include incorporation of Mitigation Measure NOI-3 accounting for a reduction of 12 dBA.

SOURCE: ESA, 2022.

However, even with all feasible mitigation, traffic signal construction activity would result in increases of ambient noise levels greater than 10 dBA at sensitive receptor location R2, which is the closest sensitive receptor to the off-site construction work. As such, environmental impacts related to the temporary or periodic increase in ambient noise levels during installation of the traffic signal widening would be significant and unavoidable with mitigation.

Construction Off-Site Roadway Noise

Construction crew commutes and the transport of construction equipment and materials to the site for the proposed Project would incrementally increase noise levels on roads leading to the site. Although there would be a relatively high single-event noise-exposure potential causing intermittent noise nuisance (passing trucks at 50 feet would generate up to a maximum of 87 dBA L_{max}), the effect on longer-term (hourly or daily) ambient noise levels would be small. Table 9 shows when construction traffic is added to the existing traffic volumes on street segments in the Project vicinity, no traffic noise level increases would exceed the 3 dBA threshold considered to be significant. Therefore, short-term construction-related impacts associated with worker commute and equipment transport to the Project Site would be less than significant.

There are ten related projects in total, five in unincorporated County, four in Diamond Bar and one in City of Industry. None are within 500 feet and two have the potential to use the same haul route (Fairway to the 60 freeway). However, as can be seen in **Table 12**, construction-related traffic would result in less than 1 dBA increase in traffic noise level along most roadway segments in the Project vicinity. Therefore, no significant construction traffic noise impacts would occur both for the Proposed Project and for the Cumulative Impacts.

TABLE 12
OFF-SITE CONSTRUCTION TRAFFIC NOISE IMPACTS – EXISTING PLUS PROJECT CONSTRUCTION

	CNEL (dBA) at Referenced Distances from Roadway Right-of-Way [a]		
Roadway Segment	**Existing**	**Existing + Project Construction**	**Difference**
Brea Canyon Cutoff Rd			
s/o Pathfinder Rd	73.5	*73.7*	0.2
Colima Rd			
between Fairway Dr and Lake Canyon Dr	72.9	*73.0*	0.1
between Lake Canyon Dr and Walnut Leaf Dr	72.7	*72.8*	0.1
between Tierra Luna and S Lemon Ave	72.8	*72.9*	0.1
between Walnut Leaf Dr and Tierra Luna	72.6	72.8	0.2
w/o Fairway Dr/Brea Canyon Cutoff Rd	73.1	73.2	0.1
East Walnut Dr South			
between Fairway Dr and Brookdale Walnut Entryway	60.8	62.0	1.2
e/o Fairway Dr	60.8	62.0	1.2
w/o Fairway Dr	60.8	61.7	0.9

Roadway Segment	CNEL (dBA) at Referenced Distances from Roadway Right-of-Way [a]		
	Existing	Existing + Project Construction	Difference
Fairway Dr			
between East Walnut Dr South and Colima Rd	72.9	73.0	0.1
between SR-60 Eastbound Off Ramp and East Walnut Dr South	73.6	73.7	0.1
between SR-60 Westbound On/Off Ramp and SR-60 Eastbound Off Ramp	72.4	72.5	0.1
n/o SR-60 Westbound On/Off Ramp	70.5	70.7	0.2
between Colima Rd and Pathfinder Rd	72.9	73.0	0.1
Golden Springs Dr			
e/o S Lemon Ave	70.1	70.3	0.2
Pathfinder Rd			
e/o Brea Canyon Cutoff Rd	70.6	70.9	0.3
w/o Brea Canyon Cutoff Rd	71.9	72.1	0.2
S Lemon Ave			
n/o Golden Springs Dr	71.6	71.8	0.2
s/o Golden Springs Dr	61.9	62.7	0.8
SR-60 Eastbound Off Ramp			
w/o Fairway Dr	69.5	69.8	0.3
SR-60 Westbound On/Off Ramp			
e/o Fairway Dr	68.4	68.8	0.4
w/o Fairway Dr	67.3	67.8	0.5
Tierra Luna [a]			
n/o Colima Rd	54.4	54.4	0.0
Walnut Leaf Dr			
s/o Colima Rd	55.9	58.5	2.6

[a] This is a residential street. No construction traffic is expected.

SOURCE: ESA 2022; Linscott, Law & Greenspan, Engineers. 2021.

2.6.2 Project Operations

This section describes the activities relating to operation of the proposed Project; including Project-related vehicular traffic and any on-site noise-generating equipment and activity.

Impacts to Off-Site Receptors from On-Site Stationary Equipment

The operation of mechanical equipment that would be installed for the Project, such as air conditioners, fans, generators, and related equipment, would generate noise levels in proximity to the equipment. Mechanical equipment would typically be located on rooftops or within buildings, shielded from nearby land uses to attenuate noise and avoid conflicts with adjacent uses. All outdoor mounted mechanical and electrical equipment would be designed to meet the requirements of County Code, Section 12.08.390. A conservative exterior noise level reference for air condenser units, the primary source of noise from fixed mechanical equipment, is 66 dBA L_{eq} measured at a distance of 3 feet based on the Noise Navigator Sound Level Database (Berger,

Neitzel & Kladden, 2016). The closest sensitive receptors are located at approximately 100 feet from the nearest sensitive receptors when accounting for the buffer zones provided by open space between existing residential receptors and the Project. At 100 feet, the noise level would attenuate to 35.5 dBA L_{eq} (not including attenuation from intervening structures, walls, or roofs). This would not exceed the allowable mechanical equipment noise level at a neighboring property line of 55 dBA, which is the LACC threshold for significant operational stationary equipment noise (see Table 3.10-8). Therefore, environmental impacts related to the exposure of persons to or generation of noise levels in excess of established standards during long-term operation of the proposed Project would be less than significant.

Operational Off-Site Roadway Noise (at Off-Site Land Uses)

Table 13, *Traffic Noise Impacts - Existing Conditions*, lists the existing baseline traffic noise levels and the existing baseline plus Project traffic noise levels. Adding the Project traffic to the existing conditions would result in little to no measurable changes in the traffic noise levels ranging from 0.0 dBA CNEL to a maximum increase of 1.4 dBA CNEL along East Walnut Drive South between Brookdale Walnut entryway and East Walnut Drive and east of Fairway Drive. The existing baseline plus Project traffic noise levels along all studied roadway segments would have noise level increase of less than the significance threshold of a 3 dBA CNEL increase in areas with noise sensitive land use currently experiencing “normally unacceptable” or “clearly unacceptable” noise levels and less than the significance threshold of a 5 dBA CNEL increase in areas with noise sensitive land use currently experiencing “normally acceptable” or “conditionally acceptable” noise levels. Therefore, no significant traffic noise impact under the existing plus Project scenario would occur from the operation of the Project.

Table 14, *Traffic Noise Impacts - Future Conditions*, lists the future baseline traffic noise levels and the future baseline plus Project traffic noise levels. Adding the Project traffic to the future baseline conditions would result in little to no measurable changes in the traffic noise levels ranging from 0.0 dBA CNEL to a maximum increase of 1.4 dBA CNEL along East Walnut Drive South between Brookdale Walnut entryway and East Walnut Drive and east of Fairway Drive. The future baseline plus Project traffic noise levels along all studied roadway segments would have a noise level increase of less than the significance threshold of a 3 dBA CNEL increase in areas with noise sensitive land use currently experiencing “normally unacceptable” or “clearly unacceptable” noise levels and less than the significance threshold of a 5 dBA CNEL increase in areas with noise sensitive land use currently experiencing “normally acceptable” or “conditionally acceptable” noise levels.. Therefore, no significant traffic noise impact under the future plus Project scenario would occur from the operation of the Project.

TABLE 13
TRAFFIC NOISE IMPACTS - EXISTING AND EXISTING PLUS PROJECT CONDITIONS

	Existing CNEL (dBA) at Referenced Distances from Roadway Right-of-Way [a]		
Roadway Segment	**Existing**	**Existing + Project**	**Difference**
Brea Canyon Cutoff Rd			
s/o Pathfinder Rd	73.5	73.6	0.1
Colima Rd			
between Fairway Dr and Lake Canyon Dr	72.9	73.2	0.3
between Lake Canyon Dr and Walnut Leaf Dr	72.7	73.1	0.4
between Tierra Luna and S Lemon Ave	72.8	72.9	0.1
between Walnut Leaf Dr and Tierra Luna	72.6	72.8	0.2
w/o Fairway Dr/Brea Canyon Cutoff Rd	73.1	73.2	0.1
East Walnut Dr South			
between Fairway Dr and Brookdale Walnut Entryway	60.8	62.2	1.4
e/o Fairway Dr	60.8	62.2	1.4
w/o Fairway Dr	60.8	60.8	0.0
Fairway Dr			
between East Walnut Dr South and Colima Rd	72.9	73.1	0.2
between SR-60 Eastbound Off Ramp and East Walnut Dr South	73.6	73.8	0.2
between SR-60 Westbound On/Off Ramp and SR-60 Eastbound Off Ramp	72.4	72.6	0.2
n/o SR-60 Westbound On/Off Ramp	70.5	70.6	0.1
between Colima Rd and Pathfinder Rd	72.9	73.0	0.1
Golden Springs Dr			
e/o S Lemon Ave	70.1	70.1	0.0
Pathfinder Rd			
e/o Brea Canyon Cutoff Rd	70.6	70.6	0.0
w/o Brea Canyon Cutoff Rd	71.9	71.9	0.0
S Lemon Ave			
n/o Golden Springs Dr	71.6	71.6	0.0
s/o Golden Springs Dr	61.9	61.9	0.0
SR-60 Eastbound Off Ramp			
w/o Fairway Dr	69.5	69.8	0.3
SR-60 Westbound On/Off Ramp			
e/o Fairway Dr	68.4	68.4	0.0
w/o Fairway Dr	67.3	67.5	0.2
Tierra Luna			
n/o Colima Rd	54.4	54.4	0.0
Walnut Leaf Dr			
s/o Colima Rd	55.9	55.9	0.0

SOURCE: ESA 2021; Linscott, Law & Greenspan, Engineers. 2022.

TABLE 14
TRAFFIC NOISE IMPACTS - FUTURE CONDITIONS

Roadway Segment	Future CNEL (dBA) at Referenced Distances from Roadway Right-of-Way [a]		
	Future	Future + Project	Difference
Brea Canyon Cutoff Rd			
s/o Pathfinder Rd	73.7	73.8	0.1
Colima Rd			
between Fairway Dr and Lake Canyon Dr	73.0	73.3	0.3
between Lake Canyon Dr and Walnut Leaf Dr	72.8	73.1	0.3
between Tierra Luna and S Lemon Ave	72.9	73.9	1.0
between Walnut Leaf Dr and Tierra Luna	72.7	72.9	0.2
w/o Fairway Dr/Brea Canyon Cutoff Rd	73.2	73.3	0.1
East Walnut Dr South			
between Fairway Dr and Brookdale Walnut Entryway	60.8	62.2	1.4
e/o Fairway Dr	60.8	62.2	1.4
w/o Fairway Dr	60.8	60.8	0.0
Fairway Dr			
between East Walnut Dr South and Colima Rd	73.0	73.2	0.2
between SR-60 Eastbound Off Ramp and East Walnut Dr South	73.7	74.0	0.3
between SR-60 Westbound On/Off Ramp and SR-60 Eastbound Off Ramp	72.6	72.7	0.1
n/o SR-60 Westbound On/Off Ramp	70.6	70.3	-0.3
between Colima Rd and Pathfinder Rd	73.0	73.2	0.2
Golden Springs Dr			
e/o S Lemon Ave	70.2	70.2	0.0
Pathfinder Rd			
e/o Brea Canyon Cutoff Rd	70.7	70.7	0.0
w/o Brea Canyon Cutoff Rd	72.0	72.0	0.0
S Lemon Ave			
n/o Golden Springs Dr	71.6	71.6	0.0
s/o Golden Springs Dr	61.9	58.6	-3.3
SR-60 Eastbound Off Ramp			
w/o Fairway Dr	69.6	69.8	0.2
SR-60 Westbound On/Off Ramp			
e/o Fairway Dr	68.5	67.0	-1.5
w/o Fairway Dr	67.4	67.6	0.2
Tierra Luna			
n/o Colima Rd	54.4	54.4	0.0
Walnut Leaf Dr			
s/o Colima Rd	55.9	55.4	-0.5

SOURCE: ESA 2021; Linscott, Law & Greenspan, Engineers 2022.

Table 15, *Traffic Noise Impacts - Cumulative Conditions*, lists the cumulative baseline traffic noise levels and the cumulative plus Project traffic noise levels. Comparing the future with Project traffic to the existing conditions would result in little to no measurable changes in the traffic noise levels, with some segments showing a slight reduction due to shifting traffic patterns under cumulative conditions, compared to the corresponding baseline traffic noise level along all roadway segments analyzed. The existing baseline plus Project plus cumulative traffic noise levels along all studied roadway segments would have noise level change of less than the significance threshold of a 3 dBA CNEL increase in areas with noise sensitive land use currently experiencing "normally unacceptable" or "clearly unacceptable" noise levels and less than the significance threshold of a 5 dBA CNEL increase in areas with noise sensitive land use currently experiencing "normally acceptable" or "conditionally acceptable" noise levels. Therefore, no significant traffic noise impact under the cumulative plus Project scenario would occur from the operation of the Project.

TABLE 15
TRAFFIC NOISE IMPACTS - CUMULATIVE CONDITIONS

	Cumulative CNEL (dBA) at Referenced Distances from Roadway Right-of-Way [a]		
Roadway Segment	**Existing**	**Existing + Project + Cumulative**	**Difference**
Brea Canyon Cutoff Rd			
s/o Pathfinder Rd	73.5	73.8	0.3
Colima Rd			
between Fairway Dr and Lake Canyon Dr	72.9	73.3	0.4
between Lake Canyon Dr and Walnut Leaf Dr	72.7	73.1	0.4
between Tierra Luna and S Lemon Ave	72.8	73.9	1.1
between Walnut Leaf Dr and Tierra Luna	72.6	72.9	0.3
w/o Fairway Dr/Brea Canyon Cutoff Rd	73.1	73.3	0.2
East Walnut Dr South			
between Fairway Dr and Brookdale Walnut Entryway	60.8	62.2	1.4
e/o Fairway Dr	60.8	62.2	1.4
w/o Fairway Dr	60.8	60.8	0.0
Fairway Dr			
between East Walnut Dr South and Colima Rd	72.9	73.2	0.3
between SR-60 Eastbound Off Ramp and East Walnut Dr South	73.6	74.0	0.4
between SR-60 Westbound On/Off Ramp and SR-60 Eastbound Off Ramp	72.4	72.7	0.3
n/o SR-60 Westbound On/Off Ramp	70.5	70.3	-0.2
between Colima Rd and Pathfinder Rd	72.9	73.2	0.3
Golden Springs Dr			
e/o S Lemon Ave	70.1	70.2	0.1
Pathfinder Rd			
e/o Brea Canyon Cutoff Rd	70.6	70.7	0.1
w/o Brea Canyon Cutoff Rd	71.9	72.0	0.1

Roadway Segment	Cumulative CNEL (dBA) at Referenced Distances from Roadway Right-of-Way [a]		
	Existing	Existing + Project + Cumulative	Difference
S Lemon Ave			
n/o Golden Springs Dr	71.6	71.6	0.0
s/o Golden Springs Dr	61.9	58.6	-3.3
SR-60 Eastbound Off Ramp			
w/o Fairway Dr	69.5	69.8	0.3
SR-60 Westbound On/Off Ramp			
e/o Fairway Dr	68.4	67.0	-1.4
w/o Fairway Dr	67.3	67.6	0.3
Tierra Luna			
n/o Colima Rd	54.4	54.4	0.0
Walnut Leaf Dr			
s/o Colima Rd	55.9	55.4	-0.5

SOURCE: ESA 2021; Raju Associates, Inc. 2021.

2.7 Noise Mitigation Measures

2.7.1 Project Construction

The following mitigation measures would be required to reduce construction impacts related to noise:

Mitigation Measure NOI-1: Temporary Construction Noise Barriers. Prior to issuance of a grading permit, temporary construction noise barriers shall be erected along Project boundary that separates on-site active construction area and off-site sensitive receivers within 200 feet of the Project boundary. Such noise barriers shall have a minimum height of 10 feet above ground to block the direct line-of-sight between onsite active construction area. Temporary barriers shall include acoustical blankets with a minimum sound transmission class (STC) rating of 25 and noise reduction coefficient (NRC) of 0.75. Temporary noise barriers shall achieve a minimum of 12 dBA reduction in construction noise.

Mitigation Measure NOI-2: Construction Equipment Noise Control. Prior to issuance of grading permits, the Project subdivider shall incorporate the following measures as a note on the grading plan cover sheet:

- Construction equipment, fixed or mobile, shall be equipped with properly operating and maintained noise mufflers consistent with manufacturers' standards.
- Construction staging areas shall be located at the greatest distance feasible from off-site sensitive uses during Project construction.
- The Project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the Project Site, whenever feasible.

Mitigation Measure NOI-3: Mobile Noise Barriers. For off-site improvements related to the traffic signal installation, the contractor shall install temporary noise barriers, prior to the issuance of grading and building permits, between the active construction area and the off-site noise-sensitive receptors. The mobile noise barriers shall achieve sound level reductions of a minimum of 10 dBA between the Project construction sites and the sensitive receptor location. These temporary noise barriers shall be used to block the line-of-sight between the engine of the crane and similarly elevated ground-level noise-sensitive receptors. The barriers should allow for repositioning in order to block the noise at the sensitive receptor as construction activities move along the Project boundary. A noise barrier is not required if it would pose a safety risk or unreasonably prevent access to the construction area as deemed by the on-site construction manager such as in areas that have limited equipment maneuvering space or access. Any barrier capable of a reduction greater than 12 dBA would require greater height and heavier noise insulation which would make mobility of the barrier infeasible and cause safety concerns related to barrier stability. Further, noise barriers would only be effective if they block the line-of-sight to sensitive receptors. The contractor shall provide documentation verifying compliance with this measure.

2.7.2 Level of Significance After Mitigation

Project Construction

As shown in Table 16, with implementation of Mitigation Measures NOI-1 and NOI-2, on-site construction activity would not result in increases of noise levels greater than 75 dBA at all of the sensitive receptor locations analyzed in the Project vicinity. However, construction activity would result in an increase in ambient noise levels greater than 10 dBA at sensitive receptor locations R2 through R5.

As such, environmental impacts related to the temporary or periodic increase in ambient noise levels during temporary construction of the proposed Project would be significant and unavoidable after implementation of all feasible mitigation measures.

Project Operations

No mitigation required.

TABLE 16
INCREASE IN AMBIENT NOISE LEVELS (L_{EQ}) AT EXISTING OFF-SITE SENSITIVE RECEPTOR LOCATIONS

Off-site Sensitive Land Uses	Existing Ambient Noise Levels (dBA L_{eq})	Estimated Construction Noise Levels - Unmitigated (dBA L_{eq}) [a]	Estimated Mitigation Measure Noise Levels Reductions (dBA L_{eq}) [b]	Estimated Construction Noise Levels - Mitigated (dBA L_{eq})	Combined Ambient Plus Mitigated Construction Noise Levels (dBA L_{eq})	Increase over Existing Ambient	Exceed Significance Threshold after Mitigation?
R1	62.1	86.0	-15.0	71.0	71.5	9.4	No
R2	49.9	85.2	-15.0	71.2	71.2	21.3	**Yes**
R3	48.0	86.0	-15.0	62.0	62.2	14.2	**Yes**
R4	46.9	85.2	-15.0	61.2	61.4	14.9	**Yes**
R5	44.6	86.5	-15.0	62.5	62.6	18	**Yes**
R6	61.1	79.9	-15.0	55.9	62.2	1.1	No

NOTE: Noise levels added logarithmically.

[a] The noise levels were estimated by including the assumption that there will be some Infrastructure phases overlap with the Building Construction phase.
[b] Mitigation noise levels include incorporation of Mitigation Measures NOI-1 and NOI-2, accounting for a reduction of 12 dBA from MM NOI-1 and 3 dBA from MM NOI-2.

SOURCE: ESA, 2022.

3.0 Vibration Impact Study

3.1 Fundamentals of Vibration

Vibration refers to groundborne noise and perceptible motion. Groundborne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors. The motion may be discernible outdoors, but without the effects associated with the shaking of a building, there is less adverse reaction. Vibration energy propagates from a source through intervening soil and rock layers to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the structure. Building vibration may be perceived by the occupants as the motion of building surfaces, the rattling of items moving on shelves or hanging on walls, or as a low-frequency rumbling noise. The rumbling noise is caused by the vibrating walls, floors, and ceilings that are radiating sound waves. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by 10 VdB or less. This is an order of magnitude below the damage threshold for normal buildings.[21]

Typical sources of groundborne vibration are construction activities (e.g., blasting, pile driving, and operating heavy-duty earth-moving equipment), steel-wheeled trains, and occasional traffic on rough roads. Problems with groundborne vibration and noise from these sources are usually localized to areas within approximately 100 feet of the vibration source, although there are examples of groundborne vibration causing interference out to distances greater than 200 feet (FTA 2018). When roadways are smooth, vibration from traffic, even heavy trucks, is rarely perceptible. It is assumed, for most projects, that the roadway surface will be smooth enough that groundborne vibration from street traffic will not exceed the impact criteria; however, construction of the Project could result in groundborne vibration that could be perceptible and annoying. Groundborne noise is not likely to be a problem as noise arriving via the normal airborne path usually will be greater than groundborne noise.

Groundborne vibration has the potential to disturb people as well as to damage buildings. Although it is very rare for mobile source-induced groundborne vibration to cause even cosmetic building damage, it is not uncommon for construction processes such as blasting and the pile driving to cause vibration of sufficient amplitudes to damage nearby buildings (FTA 2018). Groundborne vibration is usually measured in terms of vibration velocity, either the root-mean-square (RMS) velocity or peak particle velocity (PPV). RMS is best for characterizing human response to building vibration, and PPV is used to characterize potential for damage. Decibel notation acts to compress the range of numbers required to describe vibration. Vibration velocity level in decibels is defined as:

$$L_v = 20 \log_{10} [V/V_{ref}]$$

where L_v is the VdB, "V" is the RMS velocity amplitude, and "V_{ref}" is the reference velocity amplitude, or $1x10^{-6}$ inches per second (inch/sec) used in the United States. **Table 17,** *Human*

[21] FTA, Transit Noise and Vibration Impact Assessment, September 2018.

Response to Different Levels of Groundborne Noise and Vibration, illustrates human response to various vibration levels, as described in the *Transit Noise and Vibration Impact Assessment*.[22]

TABLE 17
HUMAN RESPONSE TO DIFFERENT LEVELS OF GROUNDBORNE NOISE AND VIBRATION

Vibration Velocity Level (VdB)	Noise Level (dBA)		Human Response
	Low Frequency[a]	Mid Frequency[b]	
65	25	40	Approximate threshold of perception for many humans. Low-frequency sound usually inaudible, mid-frequency sound excessive for quiet sleeping areas.
75	35	50	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level annoying. Low-frequency noise acceptable for sleeping areas, mid-frequency noise annoying in most quiet occupied areas.
85	45	60	Vibration acceptable only if there are an infrequent number of events per day. Low-frequency noise annoying for sleeping areas, mid-frequency noise annoying even for infrequent events with institutional land uses such as schools and churches.

SOURCE: Federal Transit Administration. Table 5-5, *Transit Noise and Vibration Impact Assessment* (2018).
NOTES:
VdB = vibration velocity decibels; dBA = A-weighted decibels
[a] Approximate noise level when vibration spectrum peak is near 30 Hz.
[b] Approximate noise level when vibration spectrum peak is near 60 Hz.

Factors that influence groundborne vibration and noise include the following:[23]

- **Vibration Source:** Vehicle/equipment suspension, wheel types and condition, track/roadway surface, track support system, speed, transit structure, and depth of vibration source
- **Vibration Path:** Soil type, rock layers, soil layering, depth to water table, and frost depth
- **Vibration Receiver:** Foundation type, building construction, and acoustical absorption

Among the factors listed above, there are significant differences in the vibration characteristics when the source is underground compared to at the ground surface. In addition, soil conditions are known to have a strong influence on the levels of groundborne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock.[24]

Experience with groundborne vibration shows that vibration propagation is more efficient in stiff clay soils than in loose sandy soils, and shallow rock seems to concentrate the vibration energy close to the surface, resulting in groundborne vibration problems at large distance from the source. Factors such as layering of the soil and depth to water table can have significant effects on the propagation of groundborne vibration. Soft, loose, sandy soils tend to attenuate more vibration

22 FTA, Transit Noise and Vibration Impact Assessment, September 2018.
23 FTA, Transit Noise and Vibration Impact Assessment, September 2018.
24 FTA, Transit Noise and Vibration Impact Assessment, September 2018.

energy than hard, rocky materials. Vibration propagation through groundwater is more efficient than through sandy soils.

3.1.1 Existing Conditions

Groundborne Vibration Levels

Aside from periodic construction work, field observations noted that other sources of groundborne vibration in the Project Site vicinity are primarily limited to heavy-duty vehicular travel (e.g., refuse trucks, delivery trucks, etc.) on local roadways. Trucks traveling at a distance of 50 feet typically generate groundborne vibration velocity levels of 65 VdB (approximately 0.0068 in/sec PPV).[25]

Groundborne Noise Levels

Groundborne noise levels would generally be 20 to 50 decibels lower than the velocity level depending on the frequency level of the source.[26] With a background groundborne vibration level in residential areas of 50 VdB or lower, groundborne noise levels would be approximately 0 to 30 dBA. A bus traveling at a distance of 50 feet would generate groundborne noise levels of approximately 23 to 38 dBA. The approximate level of human perception of groundborne noise is 25 dBA for low frequency vibration (near 30 Hz) and 40 dBA for mid-frequency vibration (near 60 Hz).[27]

3.2 Regulatory Setting

A number of guidance documents and regulations related to vibration have been adopted by agencies at the federal, state, and local level. Below is a discussion of these relevant vibration guidance documents and regulations.

3.2.1 Federal

The criteria for environmental impact from groundborne vibration are based on the maximum levels for a single event. **Table 18,** *Construction Vibration Damage Criteria*, lists the potential vibration damage criteria associated with construction activities, as suggested in the *Transit Noise and Vibration Impact Assessment*.[28]

[25] FTA, Transit Noise and Vibration Impact Assessment, September 2018.
[26] FTA, Transit Noise and Vibration Impact Assessment, September 2018.
[27] FTA, Transit Noise and Vibration Impact Assessment, September 2018.
[28] FTA, Transit Noise and Vibration Impact Assessment, September 2018.

TABLE 18
CONSTRUCTION VIBRATION DAMAGE CRITERIA

Building Category	PPV (inch/sec)	Approximate L_V[a]
Reinforced-concrete, steel or timber (no plaster)	0.50	102
Engineered concrete and masonry (no plaster)	0.30	98
Non-engineered timber and masonry buildings	0.20	94
Buildings extremely susceptible to vibration damage	0.12	90

SOURCE: Federal Transit Administration. Table 7-5, *Transit Noise and Vibration Impact Assessment* (2018).
NOTES:
PPV = peak particle velocity; L_V = velocity in decibels; inch/sec = inches per second
[a] Root-mean-square velocity in decibels (VdB) re 1 microinch per second.

FTA guidelines show that a vibration level of up to 102 VdB (equivalent to 0.5 inch/sec in RMS) is considered safe for buildings consisting of reinforced concrete, steel, or timber (no plaster), and would not result in any construction vibration damage. For a non-engineered timber and masonry building, the construction vibration damage criterion is 94 VdB (0.2 inch/sec in RMS).

Based on Table 6-6 in the FTA's *Transit Noise and Vibration Impact Assessment*[29],interpretation of vibration criteria for detailed analysis is 78 VdB for residential uses during daytime hours. During nighttime hours, the vibration criterion is 72 VdB. For office and office buildings, the FTA guidelines suggest that a vibration level of 84 VdB should be used for detailed analysis.

3.2.2 State

There are no State-established vibration standards. Moreover, according to the Caltrans' *Transportation and Construction Vibration Guidance Manual*, there are no official Caltrans standards for vibration.[30] However, this manual provides guidelines that can be used as screening tools for assessing the potential for adverse vibration effects related to structural damage and human perception. The manual is meant to provide practical guidance to Caltrans engineers, planners, and consultants who must address vibration issues associated with the construction, operation, and maintenance of Caltrans projects. The values for building structural damage thresholds referenced above are shown in **Table 19**, *Guideline Vibration Damage Potential Threshold Criteria*, which is taken from the *Transportation and Construction Vibration Guidance Manual*.[31]

[29] FTA, Transit Noise and Vibration Impact Assessment, September 2018.
[30] Caltrans, Transportation and Construction Vibration Guidance Manual, April 2020.
[31] Caltrans, Transportation and Construction Vibration Guidance Manual, April 2020.

TABLE 19
GUIDELINE VIBRATION DAMAGE POTENTIAL THRESHOLD CRITERIA

Structure and Condition	Maximum PPV (inch/sec)	
	Transient Sources[a]	Continuous/Frequent Intermittent Sources[b]
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.20	0.10
Historic and some old buildings	0.50	0.25
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial/commercial buildings	2.00	0.50

SOURCE: California Department of Transportation, *Transportation and Construction Vibration Guidance Manual* (2013), Table 19.

NOTES:

PPV = peak particle velocity; inch/sec = inches per second

[a] Transient sources create a single, isolated vibration event, such as blasting or drop balls.

[b] Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

The values for human annoyance shown in **Table 20**, *Caltrans Vibration Annoyance Potential Criteria*, is taken from the *Transportation and Construction Vibration Guidance Manual*.[32]

TABLE 20
CALTRANS VIBRATION ANNOYANCE POTENTIAL CRITERIA

Structure and Condition	Maximum PPV (in/sec)[a]	
	Mobile (Transient) Sources	Continuous/Frequent Intermittent Sources
Slightly perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Disturbing	2.0	0.4

[a] PPV = Peak Particle Velocity; In/sec = Inches per Second

NOTE: Mobile (transient) sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

SOURCE: Caltrans, 2013.

3.2.3 Local

The proposed Project is located within the unincorporated County of Los Angeles near the community of Rowland Heights. Applicable County of Los Angeles vibration standards are described below.

[32] Caltrans, Transportation and Construction Vibration Guidance Manual, April 2020.

County of Los Angeles

The County Noise Ordinance Section 12.08.350 provides a presumed perception threshold of 0.01 in/sec RMS; however, this applies to groundborne vibrations from long-term operational activities, such as surface traffic, and not to short-term activities such as construction. Therefore, the 0.01 in/sec RMS vibration criteria is used in connection with the Project's operation-related vibration impacts and does not apply to construction-related vibration impacts. The vibration level of 0.01 in/sec RMS is equivalent to 0.04 in/sec PPV.

3.3 Thresholds of Significance

As shown in Table 18, vibration would have a significant impact if it would cause transient groundborne vibration levels to exceed the applicable building damage criteria of 0.5 in/sec PPV for older residential structures (i.e., the nearby residential structures). For human annoyance, Table 18 shows that the distinctly perceptible vibration level from continuous/frequent intermittent sources is 0.04 in/sec (an equivalent of 80 VdB). This is similar to the 78 VdB vibration criteria identified in Table 6-6 in the FTA's *Transit Noise and Vibration Impact Assessment*[33], where it stated that a significant impact would occur if construction vibration would exceed the vibration criteria for detailed analysis of 78 VdB for residential uses during daytime hours. For office and office buildings, a significant impact would occur if construction vibration would exceed the vibration criteria for detailed analysis of 84 VdB. The vibration criteria of 0.01 in/sec RMS (equivalent to 0.04 in/sec PPV or 80 VdB) is applied to operational vibration.

For the purposes of this analysis, groundborne noise impacts are considered significant when they exceed the thresholds of significance identified above for airborne noise. However, since groundborne noise is typically much lower compared to airborne noise, addressing the impacts from airborne noise would be usually sufficient to also take care of groundborne noise.

3.4 Methodology

While County Noise Ordinance Section 12.08.350 establishes a perception threshold for vibration, the County does not have quantified groundborne vibration velocity criteria for establishing significance. For the purposes of this noise analysis, groundborne vibration and groundborne noise impacts are considered significant when they exceed the thresholds of significance identified above.

3.5 Environmental Impacts

3.5.1 Project Construction

Because vibration level in RMS is best for characterizing human response to building vibration and vibration level in PPV is best used to characterize potential for damage, this construction vibration impact analysis will discuss the human annoyance using vibration levels in VdB and will assess the potential for building damages using vibration levels in PPV (inch/sec).

[33] FTA, Transit Noise and Vibration Impact Assessment, September 2018.

Outdoor grading and excavation for the proposed Project is expected to use 1 dozer, 2 tractors/loaders/backhoes, 1 grader, 2 drill rig trucks, 4 crawler tractors, 1 excavator, 4 dump trucks, 2 vibratory pile drivers, 1 pump, and 6 scrapers. It is anticipated that the greatest levels of vibration would occur during the grading and excavation phase. All other phases are expected to result in lower vibration levels.

Existing vibration sensitive uses (residences) in the immediate vicinity would receive:

- At 50 feet, -9 VdB compared to the vibration level measured at 25 feet
- At 100 feet, -18 VdB compared to the vibration level measured at 25 feet
- At 200 feet, -27 VdB compared to the vibration level measured at 25 feet

Because vibration impacts occur normally within the buildings, the distance to the nearest sensitive uses, for vibration impact analysis purposes, is measured between the nearest off-site sensitive use buildings and the Project Site boundary (assuming the construction equipment would be used at or near the Project Site boundary).

Bulldozers and other heavy-tracked construction equipment generate approximately 87 VdB of groundborne vibration when measured at 25 feet, based on Table 7-4 of the FTA *Transit Noise and Vibration Impact Assessment*.[34] This level of groundborne vibration exceeds the threshold of human perception, which is around 65 VdB. Although this range of groundborne vibration levels would result in potential annoyance to residents adjacent to the Project Site (as discussed further below), they would not cause any damage to the buildings. Construction vibration, similar to vibration from other sources, would not have any significant effects on outdoor activities (e.g., those outside the residential buildings in the Project vicinity). As shown in Table 14, the FTA guidelines show that a vibration level of up to 102 VdB (an equivalent to 0.5 inch/sec PPV)[35]is considered safe for buildings consisting of reinforced concrete, steel, or timber (no plaster), and would not result in any construction vibration damage. For a non-engineered timber and masonry building, the construction vibration damage criterion is 94 VdB (0.2 inch/sec PPV). The PPV values for building damage thresholds referenced in **Table 21,** *Vibration Source Amplitudes for Construction Equipment*, were taken from the *Transportation and Construction Vibration Guidance Manual*.[36] Table 21 further shows the PPV values at 25 feet from the construction vibration source as well as vibration levels in terms of VdB at 25 feet from the construction vibration source.

34 FTA, Transit Noise and Vibration Impact Assessment, September 2018.
35 FTA, Transit Noise and Vibration Impact Assessment, September 2018.
36 Caltrans, Transportation and Construction Vibration Guidance Manual, April 2020.

TABLE 21
VIBRATION SOURCE AMPLITUDES FOR PROJECT CONSTRUCTION EQUIPMENT

	Reference PPV/L_V at 25 Feet		PPV/L_V at Receptor (50 Feet)	
Equipment	**PPV (inch/sec)**	**L_V (VdB)**	**PPV (inch/sec)**	**L_V (VdB)**
Pile Driver (Vibratory)	0.210	94	0.074	85
Vibratory Roller	0.210	94	0.074	85
Earth Mover	**0.011**	**69**	0.004	60
Excavator	0.047	81	0.017	72
Fork Lift	**0.047**	**81**	0.017	72
Wheel Loader	**0.076**	**86**	0.027	77
Large Bulldozer	0.089	87	0.031	78
Loaded Trucks	**0.076**	**86**	0.027	77
Jackhammer	0.035	79	0.012	70
Small Bulldozer	**0.003**	**58**	0.001	48

SOURCE: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment* (2006), Table 12-2.
NOTES:
PPV = peak particle velocity; L_V = velocity in decibels; inch/sec = inches per second; VdB = vibration velocity decibels

Construction Vibration Structural Damage

The closest residential buildings to the Project Site are more than 50 feet from the nearest construction area on the Project Site. Based on Table 17 and Table 18, it would take a vibration PPV level of more than 0.3 inch/sec to potentially result in any building damage. Table 20 shows that none of the construction equipment anticipated on the Project Site would result in a vibration level that would reach 0.3 inch/sec PPV at 25 feet from each of the Project construction equipment and/or activities. At 50 feet, these vibration levels would be attenuated (reduced) by 0.19 inch/sec PPV to 0.11 inch/sec PPV. Other off-site buildings are farther away from the Project Site and would be exposed to even lower construction vibration levels. Therefore, no building damages would occur as a result of vibration from Project construction and impacts would be less than significant.

Construction Vibration Human Annoyance

Vibration levels from standard construction equipment are shown in Table 21, above, for various pieces of construction equipment that are expected to be used on the Project Site.

The following equation shows the attenuation rate of vibration at a distance of D feet from the source, calculated from the vibration level measured at 25 feet from the source.

LvdB (D) = LvdB (25 feet) – 30 Log (D/25)

A vibration level at 50 feet is 9 VdB lower than the vibration level at 25 feet. Vibration at 100 feet from the source is 18 VdB lower than the vibration level at 25 feet. Therefore, receptors

at 50 feet from the construction activity may be exposed to groundborne vibration up to 78 VdB. Receptors at 100 feet from the source may be exposed to groundborne vibration up to 69 VdB.

For the Project construction activity, the equipment with the highest vibration generation potential is the vibratory pile driver, which, similar to the vibratory roller, would generate 94 VdB at 25 feet. With the vibration attenuation through distance divergence, the vibration from Project construction would be reduced by 9 VdB at the nearest residential buildings located 50 feet from the Project site. The highest construction vibration levels at residential buildings adjacent to the Project site would be 85 VdB or lower at the closest distance of 50 feet and impacts related to human annoyance would be potentially significant.

Because construction equipment vibration levels should not exceed the Caltrans' 0.04 in/sec PPV (or 80 VdB) threshold for annoyance of occupants in residential buildings, **Mitigation Measure NOI-4** is required. Mitigation Measure NOI-4 requires that the vibratory pile driver and vibratory roller should not be used within 75 feet of adjacent residential buildings.

Other construction equipment would not result in a vibration level that exceeds the 0.04 in/sec PPV (80 VdB) threshold for residential buildings. With the restriction of vibratory pile drivers and vibratory rollers within 75 feet of adjacent residential buildings, no significant construction vibration impacts related to human annoyance would occur. Impacts would be less than significant with the implementation of the **Mitigation Measure NOI-4**.

3.5.2 Project Operations

Operation of the Project's residential and recreational/open space would not include the use of equipment that would generate perceptible vibration. Operation of the Project would not result in an exceedance of the vibration criteria of 0.01 in/sec RMS (equivalent to 0.04 in/sec PPV). Therefore, no operational vibration impact would occur.

3.6 Vibration Mitigation Measures

3.6.1 Project Construction

The following vibration mitigation measures would be necessary for the proposed Project during construction.

> **Mitigation Measure NOI-4: Restricting Pile Driving and/or Vibratory Roller Activities:** During construction vibratory pile drivers and/or vibratory rollers shall not be used within 75 feet of residential buildings adjacent to the Project Site.

3.6.2 Project Operations

No vibration mitigation measures would be necessary for Project operation.

4. References

California Code of Regulations, Title 14, Section 15168(c).

California Department of Transportation (Caltrans), *Technical Noise Supplement* (TeNS), September 2013.

Caltrans, *Traffic Noise Analysis Protocol*, May 2011.

Caltrans, *Transportation and Construction Vibration Guidance Manual*, April 2020.

County of Los Angeles, Noise Element and Municipal Code.

Federal Highway Administration (FHWA), *Highway Noise Barrier Design Handbook*, 2000.

FHWA, *Roadway Construction Noise Model User's Guide*, 2006.

FHWA, Traffic Noise Model Version 2.5, 2004.

FTA, *Transit Noise and Vibration Impact Assessment*, September 2018.

Linscott, Law & Greenspan, Engineers (LLG). 2022. Transportation Impact Analysis – Royal Vista Residential and Parks Project, November, 2022.

USEPA, *EPA Identifies Noise Levels Affecting Health and Welfare*, April 1974.

USEPA, Protective Noise Levels, Condensed Version of EPA Levels Document (EPA 550/9-79-100, November 1978).

Appendix A

Noise Measurement and Calculations

ESA

Project: Royal Vista

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	8	Daytime hours (7 am to 7 pm)
	0	Evening hours (7 pm to 10 pm)
	0	Nighttime hours (10 pm to 7 am)
Leq to L10 factor	3	

				R1					R2					R3					R4					R5					R6				
Construction Phase **Equipment Type**	**No. of Equip.**	**Reference Noise Level at 50ft, Lmax**	**Acoustical Usage Factor**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**	**Distance (ft)**	**Lmax**	**Leq**	**L11**	**Estimated Noise Shielding, dBA**	**Distance (ft)**	**Lmax**	**Leq**	**L12**	**Estimated Noise Shielding, dBA**	**Distance (ft)**	**Lmax**	**Leq**	**L11**	**Estimated Noise Shielding, dBA**	**Distance (ft)**	**Lmax**	**Leq**	**L12**	**Estimated Noise Shielding, dBA**	**Distance (ft)**	**Lmax**	**Leq**	**L13**	**Estimated Noise Shielding, dBA**
Demolition					***76***	***70***				***76***	***70***				***76***	***70***				***76***	***70***				***77***	***71***				***70***	***64***		
Tractor/Loader/Backhoe	2	80	40%	250	54	50	53	15	500	48	44	47	15	250	54	50	53	15	500	48	44	47	15	200	56	52	55	15	600	46	42	45	15
Concrete Saw	1	90	20%	50	75	68	71	15	50	75	68	71	15	50	75	68	71	15	50	75	68	71	15	50	75	68	71	15	100	69	62	65	15
Tractor	2	84	40%	150	62	58	61	15	250	58	54	57	15	150	62	58	61	15	250	58	54	57	15	125	64	60	63	15	300	56	52	55	15
Excavator	1	85	40%	50	70	66	69	15	50	70	66	69	15	50	70	66	69	15	50	70	66	69	15	50	70	66	69	15	100	64	60	63	15
Jackhammer	1	85	20%	250	56	49	52	15	500	50	43	46	15	250	56	49	52	15	500	50	43	46	15	200	58	51	54 0	15	600	48	41	44	15
Site Preparation					***72***	***68***				***72***	***68***				***72***	***68***				***72***	***68***				***72***	***68***				***66***	***62***		
Tractor/Loader/Backhoe	2	80	40%	150	58	54	57	15	250	54	50	53	15	150	58	54	57	15	250	54	50	53	15	125	60	56	59	15	300	52	48	51	15
Tractor	2	84	40%	50	72	68	71	15	50	72	68	71	15	50	72	68	71	15	50	72	68	71	15	50	72	68	71	15	100	66	62	65	15
Excavator	1	85	40%	250	56	52	55	15	500	50	46	49	15	250	56	52	55	15	500	50	46	49	15	200	58	54	57	15	600	48	44	47	15
Grading/Excavation					***75***	***70***				***72***	***68***				***75***	***70***				***72***	***68***				***76***	***71***				***68***	***64***		
Tractor/Loader/Backhoe	2	80	40%	150	58	54	57	15	250	54	50	53	15	150	58	54	57	15	250	54	50	53	15	125	60	56	59	15	300	52	48	51	15
Drill Rig Truck	2	84	20%	250	58	51	54	15	500	52	45	48	15	250	58	51	54	15	500	52	45	48	15	200	60	53	56	15	600	50	43	46	15
Tractor	4	84	40%	250	61	57	60	15	500	55	51	54	15	250	61	57	60	15	500	55	51	54	15	200	63	59	62	15	600	53	49	52	15
Excavator	1	85	40%	150	60	56	59	15	250	56	52	55	15	150	60	56	59	15	250	56	52	55	15	125	62	58	61	15	300	54	50	53	15
Grader	1	85	40%	50	70	66	69	15	50	70	66	69	15	50	70	66	69	15	50	70	66	69	15	50	70	66	69	15	100	64	60	63	15
Dump Truck	4	84	40%	250	61	57	60	15	500	55	51	54	15	250	61	57	60	15	500	55	51	54	15	200	63	59	62	15	600	53	49	52	15
Vibratory Pile Driver	2	95	20%	250	69	62	65	15	500	63	56	59	15	250	69	62	65	15	500	63	56	59	15	200	71	64	67	15	600	61	54	57	15
Pumps	1	77	50%	150	52	49	52	15	250	48	45	48	15	150	52	49	52	15	250	48	45	48	15	125	54	51	54	15	300	46	43	46	15
Dozer	1	85	40%	150	60	56	59	15	250	56	52	55	15	150	60	56	59	15	250	56	52	55	15	125	62	58	61	15	300	54	50	53	15
Scraper	6	85	40%	150	68	64	67	15	250	64	60	63	15	150	68	64	67	15	250	64	60	63	15	125	70	66	69	15	300	62	58	61	15
Drainage/Utilities/Trenching					***74***	***70***				***73***	***69***				***74***	***70***				***73***	***69***				***74***	***70***				***68***	***64***		
Excavator	2	85	40%	50	73	69	72	15	50	73	69	72	15	50	73	69	72	15	50	73	69	72	15	50	73	69	72	15	100	67	63	66	15
Grader	1	85	40%	250	56	52	55	15	500	50	46	49	15	250	56	52	55	15	500	50	46	49	15	200	58	54	57	15	600	48	44	47	15
Dozer	1	85	40%	250	56	52	55	15	500	50	46	49	15	250	56	52	55	15	500	50	46	49	15	200	58	54	57	15	600	48	44	47	15
Scraper	2	85	40%	150	63	59	62	15	250	59	55	58	15	150	63	59	62	15	250	59	55	58	15	125	65	61	64	15	300	57	53	56	15
Tractor/Loader/Backhoe	2	80	40%	150	58	54	57	15	250	54	50	53	15	150	58	54	57	15	250	54	50	53	15	125	60	56	59	15	300	52	48	51	15
Foundations/Concrete Pour					***70***	***71***				***69***	***70***				***70***	***71***				***69***	***70***				***71***	***72***				***64***	***65***		
Excavator	2	85	40%	250	59	55	58	15	500	53	49	52	15	250	59	55	58	15	500	53	49	52	15	200	61	57	60	15	600	51	47	50	15
Grader	1	85	40%	250	56	52	55	15	500	50	46	49	15	250	56	52	55	15	500	50	46	49	15	200	58	54	57	15	600	48	44	47	15
Dozer	1	85	40%	150	60	56	59	15	250	56	52	55	15	150	60	56	59	15	250	56	52	55	15	125	62	58	61	15	300	54	50	53	15
Scraper	2	85	40%	150	63	59	62	15	250	59	55	58	15	150	63	59	62	15	250	59	55	58	15	125	65	61	64	15	300	57	53	56	15
Tractor/Loader/Backhoe	2	80	40%	50	68	64	67	15	50	68	64	67	15	50	68	64	67	15	50	68	64	67	15	50	68	64	67	15	100	62	58	61	15
Building Construction					***70***	***71***				***70***	***71***				***70***	***71***				***70***	***71***				***71***	***71***				***64***	***65***		
Crane	1	85	16%	150	60	52	55	15	250	56	48	51	15	150	60	52	55	15	250	56	48	51	15	125	62	54	57	15	300	54	46	49	15
Forklift	3	75	10%	250	51	41	44	15	500	45	35	38	15	250	51	41	44	15	500	45	35	38	15	200	53	43	46	15	600	43	33	36	15
Generator	1	82	50%	250	53	50	53	15	500	47	44	47	15	250	53	50	53	15	500	47	44	47	15	200	55	52	55	15	600	45	42	45	15
Tractor/Loader/Backhoe	3	80	40%	50	70	66	69	15	50	70	66	69	15	50	70	66	69	15	50	70	66	69	15	50	70	66	69	15	100	64	60	63	15
Welder	1	73	40%	150	48	44	47	15	250	44	40	43	15	150	48	44	47	15	250	44	40	43	15	125	50	46	49	15	300	42	38	41	15
Paving					***74***	***67***				***73***	***67***				***74***	***67***				***73***	***67***				***74***	***68***				***68***	***61***		
Paver	2	85	50%	150	63	60	63	15	250	59	56	59	15	150	63	60	63	15	250	59	56	59	15	125	65	62	65	15	300	57	54	57	15
Other Equipment	2	85	50%	250	59	56	59	15	500	53	50	53	15	250	59	56	59	15	500	53	50	53	15	200	61	58	61	15	600	51	48	51	15
Roller	2	85	20%	50	73	66	69	15	50	73	66	69	15	50	73	66	69	15	50	73	66	69	15	50	73	66	69	15	100	67	60	63	15
Architectural Coating					***65***	***61***				***65***	***61***				***65***	***61***				***65***	***61***				***65***	***61***				***59***	***55***		
Compressor (air)	1	80	40%	50	65	61	64	15	50	65	61	64	15	50	65	61	64	15	50	65	61	64	15	50	65	61	64	15	100	59	55	58	15
Overlapping Phases																																	
Drainage/Utilities/Trenching and Foundations/Concrete Pour						74					73					74					73					74					67		
Drainage/Utilities/Trenching and Building Construction						73					73					73					73					74					67		
Drainage/Utilities/Trenching and Paving						72					71					72					71					72					66		
Foundations/Concrete Pour and Building Construction						74					73					74					73					75					68		
Foundations/Concrete Pour and Paving						73					71					73					71					73					67		
Foundations/Concrete Pour and Architectural Coating						72					70					72					70					72					65		
Building Construction and Architectural Coating						71					71					71					71					71					65		
Maximum Combined Noise Levels						**74.0**					**73.2**					**74.0**					**73.2**					**74.5**					**67.9**		

Source for Ref. Noise Levels: LA CEQA Guides, 2006 & FHWA RCNM, 2005

Project: Royal Vista - Offsite Improvements

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	8	Daytime hours (7 am to 7 pm)
	0	Evening hours (7 pm to 10 pm)
	0	Nighttime hours (10 pm to 7 am)
Leq to L10 factor	3	

				R1				
Construction Phase **Equipment Type**	**No. of Equip.**	**Reference Noise Level at 50ft, Lmax**	**Acoustical Usage Factor**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**
Site Preparation					***74***	***70***		
Tractor/Loader/Backhoe	1	80	40%	150	70	66	69	0
Tractor	1	84	40%	250	70	66	69	0
Excavator	1	85	40%	350	68	64	67	0
Paving					***77***	***74***		
Paver	1	85	50%	150	75	72	75	0
Other Equipment	1	85	50%	250	71	68	71	0
Roller	1	85	20%	350	68	61	64	0
Traffic Signal					***91***	***83***		
Crane	1	85	16%	25	91	83	86	0

Source for Ref. Noise Levels: LA CEQA Guides, 2006 & FHWA RCNM, 2005

Royal Vista
Traffic Noise Summary Tables
Existing + Construction

Roadway Segment	Existing Land Uses Located Along Roadway Segment	Traffic Noise Levels (dBA CNEL)			
		Existing	Construction	Increase over Existing	Significant Impact?
Brea Canyon Cutoff Rd s/o Pathfinder Rd	Residential/Open Space	73.5	73.6	0.1	No
Colima Rd between Fairway Dr/Brea Canyon Cutoff Rd and Lake Canyon Dr	Golf Course/Residential/Commercial	72.9	73.0	0.1	No
Colima Rd between Lake Canyon Dr and Walnut Leaf Dr	Golf Course/Residential	72.7	72.8	0.1	No
Colima Rd between Tierra Luna and S Lemon Ave	Golf Course/Residential	72.8	72.9	0.1	No
Colima Rd between Walnut Leaf Dr and Tierra Luna	Golf Course/Residential	72.6	72.8	0.1	No
Colima Rd w/o Fairway Dr/Brea Canyon Cutoff Rd	Residential/Commercial	73.1	73.2	0.1	No
East Walnut Dr South between Fairway Dr and Brookdale Walnut Entryway	Golf Course/Residential/Commercial	60.8	62.0	1.2	No
East Walnut Dr South e/o Fairway Dr	Golf Course/Residential/Commercial	60.8	62.0	1.2	No
East Walnut Dr South w/o Fairway Dr	Residential/Commercial/Educational/Industrial	60.8	61.7	0.9	No
Fairway Dr between East Walnut Dr South and Colima Rd	Golf Course/Residential/Commercial/Religious	72.9	73.0	0.1	No
Fairway Dr between SR-60 Eastbound Offramp and East Walnut Dr South	Commercial/Industrial/Hotel	73.6	73.7	0.1	No
Fairway Dr between SR-60 Westbound On/Off Ramp and SR-60 Eastbound Offramp	Commercial/Industrial	72.4	72.5	0.2	No
Fairway Dr n/o SR-60 Westbound On/Off Ramp	Industrial	70.5	70.7	0.2	No
Fairway Dr/Brea Canyon Cutoff Rd between Colima Rd and Pathfinder Rd	Residential/Commercial/Educational	72.9	73.0	0.1	No
Golden Springs Dr e/o S Lemon Ave	Residential/Commercial	70.1	70.3	0.2	No
Pathfinder Rd e/o Brea Canyon Cutoff Rd	Residential	70.6	70.9	0.2	No
Pathfinder Rd w/o Brea Canyon Cutoff Rd	Residential	71.9	72.1	0.2	No
S Lemon Ave n/o Golden Springs Dr	Commercial/Industrial	71.6	71.8	0.2	No
S Lemon Ave s/o Golden Springs Dr	Residential	61.9	62.7	0.8	No
SR-60 Eastbound Offramp w/o Fairway Dr	Commercial/Industrial	69.5	69.8	0.3	No
SR-60 Westbound On/Off Ramp e/o Fairway Dr	Commercial/Industrial	68.4	68.8	0.4	No
SR-60 Westbound On/Off Ramp w/o Fairway Dr	Commercial/Industrial	67.3	67.8	0.5	No
Walnut Leaf Dr s/o Colima Rd	Golf Course/Residential	55.9	58.5	2.6	No

Royal Vista
Traffic Noise Summary Tables
Existing + Project

Roadway Segment	Existing Land Uses Located Along Roadway Segment	Traffic Noise Levels (dBA CNEL)			
		Existing	Existing with Project	Increase over Existing	Significant Impact?
Brea Canyon Cutoff Rd s/o Pathfinder Rd	Residential/Open Space	73.5	73.6	0.1	No
Colima Rd between Fairway Dr/Brea Canyon Cutoff Rd and Lake Canyon Dr	Golf Course/Residential/Commercial	72.9	73.2	0.3	No
Colima Rd between Lake Canyon Dr and Walnut Leaf Dr	Golf Course/Residential	72.7	73.0	0.3	No
Colima Rd between Tierra Luna and S Lemon Ave	Golf Course/Residential	72.8	72.9	0.0	No
Colima Rd between Walnut Leaf Dr and Tierra Luna	Golf Course/Residential	72.6	72.8	0.2	No
Colima Rd w/o Fairway Dr/Brea Canyon Cutoff Rd	Residential/Commercial	73.1	73.2	0.1	No
East Walnut Dr South between Fairway Dr and Brookdale Walnut Entryway	Golf Course/Residential/Commercial	60.8	62.2	1.3	No
East Walnut Dr South e/o Fairway Dr	Golf Course/Residential/Commercial	60.8	62.2	1.3	No
East Walnut Dr South w/o Fairway Dr	Residential/Commercial/Educational/Industrial	60.8	60.8	0.0	No
Fairway Dr between East Walnut Dr South and Colima Rd	Golf Course/Residential/Commercial/Religious	72.9	73.1	0.2	No
Fairway Dr between SR-60 Eastbound Offramp and East Walnut Dr South	Commercial/Industrial/Hotel	73.6	73.8	0.2	No
Fairway Dr between SR-60 Westbound On/Off Ramp and SR-60 Eastbound Offramp	Commercial/Industrial	72.4	72.6	0.2	No
Fairway Dr n/o SR-60 Westbound On/Off Ramp	Industrial	70.5	70.6	0.1	No
Fairway Dr/Brea Canyon Cutoff Rd between Colima Rd and Pathfinder Rd	Residential/Commercial/Educational	72.9	73.0	0.1	No
Golden Springs Dr e/o S Lemon Ave	Residential/Commercial	70.1	70.1	0.0	No
Pathfinder Rd e/o Brea Canyon Cutoff Rd	Residential	70.6	70.6	0.0	No
Pathfinder Rd w/o Brea Canyon Cutoff Rd	Residential	71.9	71.9	0.0	No
S Lemon Ave n/o Golden Springs Dr	Commercial/Industrial	71.6	71.6	0.0	No
S Lemon Ave s/o Golden Springs Dr	Residential	61.9	61.9	0.0	No
SR-60 Eastbound Offramp w/o Fairway Dr	Commercial/Industrial	69.5	69.7	0.2	No
SR-60 Westbound On/Off Ramp e/o Fairway Dr	Commercial/Industrial	68.4	68.4	0.0	No
SR-60 Westbound On/Off Ramp w/o Fairway Dr	Commercial/Industrial	67.3	67.5	0.2	No
Walnut Leaf Dr s/o Colima Rd	Golf Course/Residential	55.9	55.9	0.0	No

Royal Vista
Traffic Noise Summary Tables
Future Year + Project

Roadway Segment	Existing Land Uses Located Along Roadway Segment	Traffic Noise Levels (dBA CNEL) Future Year	Future Year with Project	Increase over Existing	Significant Impact?
Brea Canyon Cutoff Rd s/o Pathfinder Rd	Residential/Open Space	73.8	73.9	0.1	No
Colima Rd between Fairway Dr/Brea Canyon Cutoff Rd and Lake Canyon Dr	Golf Course/Residential/Commercial	73.1	73.4	0.3	No
Colima Rd between Lake Canyon Dr and Walnut Leaf Dr	Golf Course/Residential	72.9	73.2	0.3	No
Colima Rd between Tierra Luna and S Lemon Ave	Golf Course/Residential	73.0	73.1	0.0	No
Colima Rd between Walnut Leaf Dr and Tierra Luna	Golf Course/Residential	72.9	73.0	0.2	No
Colima Rd w/o Fairway Dr/Brea Canyon Cutoff Rd	Residential/Commercial	73.4	73.4	0.1	No
East Walnut Dr South between Fairway Dr and Brookdale Walnut Entryway	Golf Course/Residential/Commercial	60.9	62.2	1.3	No
East Walnut Dr South e/o Fairway Dr	Golf Course/Residential/Commercial	60.9	62.2	1.3	No
East Walnut Dr South w/o Fairway Dr	Residential/Commercial/Educational/Industrial	60.9	60.9	0.0	No
Fairway Dr between East Walnut Dr South and Colima Rd	Golf Course/Residential/Commercial/Religious	73.2	73.3	0.2	No
Fairway Dr between SR-60 Eastbound Offramp and East Walnut Dr South	Commercial/Industrial/Hotel	73.9	74.0	0.2	No
Fairway Dr between SR-60 Westbound On/Off Ramp and SR-60 Eastbound Offramp	Commercial/Industrial	72.7	72.9	0.2	No
Fairway Dr n/o SR-60 Westbound On/Off Ramp	Industrial	70.7	70.8	0.1	No
Fairway Dr/Brea Canyon Cutoff Rd between Colima Rd and Pathfinder Rd	Residential/Commercial/Educational	73.2	73.3	0.1	No
Golden Springs Dr e/o S Lemon Ave	Residential/Commercial	70.3	70.3	0.0	No
Pathfinder Rd e/o Brea Canyon Cutoff Rd	Residential	70.8	70.8	0.0	No
Pathfinder Rd w/o Brea Canyon Cutoff Rd	Residential	72.1	72.1	0.0	No
S Lemon Ave n/o Golden Springs Dr	Commercial/Industrial	71.7	71.7	0.0	No
S Lemon Ave s/o Golden Springs Dr	Residential	62.0	62.0	0.0	No
SR-60 Eastbound Offramp w/o Fairway Dr	Commercial/Industrial	69.7	69.9	0.2	No
SR-60 Westbound On/Off Ramp e/o Fairway Dr	Commercial/Industrial	68.6	68.6	0.0	No
SR-60 Westbound On/Off Ramp w/o Fairway Dr	Commercial/Industrial	67.5	67.7	0.2	No
Tierra Luna n/o Colima Rd	Golf Course/Residential	54.5	54.5	0.0	No
Walnut Leaf Dr s/o Colima Rd	Golf Course/Residential	56.0	56.0	0.0	No

Royal Vista
Traffic Noise Summary Tables
Cumulative

Roadway Segment	Existing Land Uses Located Along Roadway Segment	Traffic Noise Levels (dBA CNEL) Existing Year	Future Year with Project	Increase over Existing	Significant Impact?
Brea Canyon Cutoff Rd s/o Pathfinder Rd	Residential/Open Space	73.5	73.9	0.3	No
Colima Rd between Fairway Dr/Brea Canyon Cutoff Rd and Lake Canyon Dr	Golf Course/Residential/Commercial	72.9	73.4	0.5	No
Colima Rd between Lake Canyon Dr and Walnut Leaf Dr	Golf Course/Residential	72.7	73.2	0.5	No
Colima Rd between Tierra Luna and S Lemon Ave	Golf Course/Residential	72.8	73.1	0.3	No
Colima Rd between Walnut Leaf Dr and Tierra Luna	Golf Course/Residential	72.6	73.0	0.4	No
Colima Rd w/o Fairway Dr/Brea Canyon Cutoff Rd	Residential/Commercial	73.1	73.4	0.3	No
East Walnut Dr South between Fairway Dr and Brookdale Walnut Entryway	Golf Course/Residential/Commercial	60.8	62.2	1.4	No
East Walnut Dr South e/o Fairway Dr	Golf Course/Residential/Commercial	60.8	62.2	1.4	No
East Walnut Dr South w/o Fairway Dr	Residential/Commercial/Educational/Industrial	60.8	60.9	0.1	No
Fairway Dr between East Walnut Dr South and Colima Rd	Golf Course/Residential/Commercial/Religious	72.9	73.3	0.4	No
Fairway Dr between SR-60 Eastbound Offramp and East Walnut Dr South	Commercial/Industrial/Hotel	73.6	74.0	0.4	No
Fairway Dr between SR-60 Westbound On/Off Ramp and SR-60 Eastbound Offramp	Commercial/Industrial	72.4	72.9	0.5	No
Fairway Dr n/o SR-60 Westbound On/Off Ramp	Industrial	70.5	70.8	0.3	No
Fairway Dr/Brea Canyon Cutoff Rd between Colima Rd and Pathfinder Rd	Residential/Commercial/Educational	72.9	73.3	0.4	No
Golden Springs Dr e/o S Lemon Ave	Residential/Commercial	70.1	70.3	0.2	No
Pathfinder Rd e/o Brea Canyon Cutoff Rd	Residential	70.6	70.8	0.2	No
Pathfinder Rd w/o Brea Canyon Cutoff Rd	Residential	71.9	72.1	0.2	No
S Lemon Ave n/o Golden Springs Dr	Commercial/Industrial	71.6	71.7	0.1	No
S Lemon Ave s/o Golden Springs Dr	Residential	61.9	62.0	0.1	No
SR-60 Eastbound Offramp w/o Fairway Dr	Commercial/Industrial	69.5	69.9	0.4	No
SR-60 Westbound On/Off Ramp e/o Fairway Dr	Commercial/Industrial	68.4	68.6	0.2	No
SR-60 Westbound On/Off Ramp w/o Fairway Dr	Commercial/Industrial	67.3	67.7	0.3	No
Tierra Luna n/o Colima Rd	Golf Course/Residential	54.4	54.5	0.1	No
Walnut Leaf Dr s/o Colima Rd	Golf Course/Residential	55.9	56.0	0.1	No

TRAFFIC NOISE ANALYSIS TOOL

Project Name: Royal Vista
Analysis Scenario: Existing + Construction
Source of Traffic Volumes: Linscott, Law & Greenspan

Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Haul Trucks with Mufflers	Hard	30	45	45	40	2049	44	24	73.3	73.6
Colima Rd between Fairway Dr/Brea Canyon Cutoff Rd and Lake Canyon Dr	Hard	30	45	45	40	1779	38	21	72.7	73.0
Colima Rd between Lake Canyon Dr and Walnut Leaf Dr	Hard	30	45	45	40	1696	36	20	72.5	72.8
Colima Rd between Tierra Luna and S Lemon Ave	Hard	30	45	45	40	1738	37	21	72.6	72.9
Colima Rd between Walnut Leaf Dr and Tierra Luna	Hard	30	45	45	40	1670	36	20	72.5	72.8
Colima Rd w/o Fairway Dr/Brea Canyon Cutoff Rd	Hard	30	45	45	40	1856	40	22	72.9	73.2
East Walnut Dr South between Fairway Dr and Brookdale Walnut Entryway	Hard	30	35	35	30	243	7	5	61.7	62.0
East Walnut Dr South e/o Fairway Dr	Hard	30	35	35	30	243	7	5	61.7	62.0
East Walnut Dr South w/o Fairway Dr	Hard	30	25	25	25	462	11	8	61.4	61.7
Fairway Dr between East Walnut Dr South and Colima Rd	Hard	30	45	45	40	1776	38	21	72.7	73.0
Fairway Dr between SR-60 Eastbound Offramp and East Walnut Dr South	Hard	30	45	45	40	2090	45	24	73.4	73.7
Fairway Dr between SR-60 Westbound On/Off Ramp and SR-60 Eastbound Offran	Hard	30	45	45	40	1582	34	19	72.2	72.5
Fairway Dr n/o SR-60 Westbound On/Off Ramp	Hard	30	45	45	40	1034	23	14	70.4	70.7
Fairway Dr/Brea Canyon Cutoff Rd between Colima Rd and Pathfinder Rd	Hard	30	45	45	40	1765	38	21	72.7	73.0
Golden Springs Dr e/o S Lemon Ave	Hard	30	35	35	30	1877	40	22	70.0	70.3
Lake Canyon Dr s/o Colima Rd	Hard	30	30	30	25	155	5	4	58.8	59.1
Pathfinder Rd e/o Brea Canyon Cutoff Rd	Hard	30	45	45	40	1062	23	14	70.6	70.9
Pathfinder Rd w/o Brea Canyon Cutoff Rd	Hard	30	45	45	40	1420	31	18	71.8	72.1
S Lemon Ave n/o Golden Springs Dr	Hard	30	45	45	40	1317	29	16	71.5	71.8
S Lemon Ave s/o Golden Springs Dr	Hard	30	30	30	25	422	10	7	62.4	62.7
SR-60 Eastbound Offramp w/o Fairway Dr	Hard	30	45	45	40	830	19	11	69.5	69.8
SR-60 Westbound On/Off Ramp e/o Fairway Dr	Hard	30	45	45	40	646	15	10	68.5	68.8
SR-60 Westbound On/Off Ramp w/o Fairway Dr	Hard	30	45	45	40	508	12	8	67.5	67.8
Walnut Leaf Dr s/o Colima Rd	Hard	30	30	30	25	126	4	4	58.2	58.5

TRAFFIC NOISE ANALYSIS TOOL

Project Name: Royal Vista
Analysis Scenario: Existing
Source of Traffic Volumes: Linscott, Law & Greenspan

Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Brea Canyon Cutoff Rd s/o Pathfinder Rd	Hard	30	45	45	40	2024	42	21	73.2	73.5
Colima Rd between Fairway Dr/Brea Canyon Cutoff Rd and Lake Canyon Dr	Hard	30	45	45	40	1754	36	18	72.6	72.9
Colima Rd between Lake Canyon Dr and Walnut Leaf Dr	Hard	30	45	45	40	1671	34	17	72.4	72.7
Colima Rd between Tierra Luna and S Lemon Ave	Hard	30	45	45	40	1713	35	18	72.5	72.8
Colima Rd between Walnut Leaf Dr and Tierra Luna	Hard	30	45	45	40	1645	34	17	72.3	72.6
Colima Rd w/o Fairway Dr/Brea Canyon Cutoff Rd	Hard	30	45	45	40	1831	38	19	72.8	73.1
East Walnut Dr South between Fairway Dr and Brookdale Walnut Entryway	Hard	30	35	35	30	218	5	2	60.5	60.8
East Walnut Dr South e/o Fairway Dr	Hard	30	35	35	30	218	5	2	60.5	60.8
East Walnut Dr South w/o Fairway Dr	Hard	30	25	25	25	437	9	5	60.5	60.8
Fairway Dr between East Walnut Dr South and Colima Rd	Hard	30	45	45	40	1751	36	18	72.6	72.9
Fairway Dr between SR-60 Eastbound Offramp and East Walnut Dr South	Hard	30	45	45	40	2065	43	21	73.3	73.6
Fairway Dr between SR-60 Westbound On/Off Ramp and SR-60 Eastbound Offran	Hard	30	45	45	40	1557	32	16	72.1	72.4
Fairway Dr n/o SR-60 Westbound On/Off Ramp	Hard	30	45	45	40	1009	21	10	70.2	70.5
Fairway Dr/Brea Canyon Cutoff Rd between Colima Rd and Pathfinder Rd	Hard	30	45	45	40	1740	36	18	72.6	72.9
Golden Springs Dr e/o S Lemon Ave	Hard	30	35	35	30	1852	38	19	69.8	70.1
Pathfinder Rd e/o Brea Canyon Cutoff Rd	Hard	30	45	45	40	1037	21	11	70.3	70.6
Pathfinder Rd w/o Brea Canyon Cutoff Rd	Hard	30	45	45	40	1395	29	14	71.6	71.9
S Lemon Ave n/o Golden Springs Dr	Hard	30	45	45	40	1292	27	13	71.3	71.6
S Lemon Ave s/o Golden Springs Dr	Hard	30	30	30	25	397	8	4	61.6	61.9
SR-60 Eastbound Offramp w/o Fairway Dr	Hard	30	45	45	40	805	17	8	69.2	69.5
SR-60 Westbound On/Off Ramp e/o Fairway Dr	Hard	30	45	45	40	621	13	6	68.1	68.4
SR-60 Westbound On/Off Ramp w/o Fairway Dr	Hard	30	45	45	40	483	10	5	67.0	67.3
Tierra Luna n/o Colima Rd	Hard	30	30	30	25	71	1	1	54.1	54.4
Walnut Leaf Dr s/o Colima Rd	Hard	30	30	30	25	101	2	1	55.6	55.9

TRAFFIC NOISE ANALYSIS TOOL

Project Name: Royal Vista
Analysis Scenario: Existing + Project
Source of Traffic Volumes: Linscott, Law & Greenspan

Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Brea Canyon Cutoff Rd s/o Pathfinder Rd	Hard	30	45	45	40	2071	43	21	73.3	73.6
Colima Rd between Fairway Dr/Brea Canyon Cutoff Rd and Lake Canyon Dr	Hard	30	45	45	40	1877	39	19	72.9	73.2
Colima Rd between Lake Canyon Dr and Walnut Leaf Dr	Hard	30	45	45	40	1807	37	19	72.7	73.0
Colima Rd between Tierra Luna and S Lemon Ave	Hard	30	45	45	40	1728	36	18	72.6	72.9
Colima Rd between Walnut Leaf Dr and Tierra Luna	Hard	30	45	45	40	1707	35	18	72.5	72.8
Colima Rd w/o Fairway Dr/Brea Canyon Cutoff Rd	Hard	30	45	45	40	1873	39	19	72.9	73.2
East Walnut Dr South between Fairway Dr and Brookdale Walnut Entryway	Hard	30	35	35	30	296	6	3	61.9	62.2
East Walnut Dr South e/o Fairway Dr	Hard	30	35	35	30	296	6	3	61.9	62.2
East Walnut Dr South w/o Fairway Dr	Hard	30	25	25	25	437	9	5	60.5	60.8
Fairway Dr between East Walnut Dr South and Colima Rd	Hard	30	45	45	40	1821	38	19	72.8	73.1
Fairway Dr between SR-60 Eastbound Offramp and East Walnut Dr South	Hard	30	45	45	40	2167	45	22	73.5	73.8
Fairway Dr between SR-60 Westbound On/Off Ramp and SR-60 Eastbound Offran	Hard	30	45	45	40	1618	33	17	72.3	72.6
Fairway Dr n/o SR-60 Westbound On/Off Ramp	Hard	30	45	45	40	1026	21	11	70.3	70.6
Fairway Dr/Brea Canyon Cutoff Rd between Colima Rd and Pathfinder Rd	Hard	30	45	45	40	1783	37	18	72.7	73.0
Golden Springs Dr e/o S Lemon Ave	Hard	30	35	35	30	1853	38	19	69.8	70.1
Pathfinder Rd e/o Brea Canyon Cutoff Rd	Hard	30	45	45	40	1035	21	11	70.3	70.6
Pathfinder Rd w/o Brea Canyon Cutoff Rd	Hard	30	45	45	40	1393	29	14	71.6	71.9
S Lemon Ave n/o Golden Springs Dr	Hard	30	45	45	40	1305	27	13	71.3	71.6
S Lemon Ave s/o Golden Springs Dr	Hard	30	30	30	25	397	8	4	61.6	61.9
SR-60 Eastbound Offramp w/o Fairway Dr	Hard	30	45	45	40	845	17	9	69.4	69.7
SR-60 Westbound On/Off Ramp e/o Fairway Dr	Hard	30	45	45	40	624	13	6	68.1	68.4
SR-60 Westbound On/Off Ramp w/o Fairway Dr	Hard	30	45	45	40	505	10	5	67.2	67.5
Tierra Luna n/o Colima Rd	Hard	30	30	30	25	71	1	1	54.1	54.4
Walnut Leaf Dr s/o Colima Rd	Hard	30	30	30	25	101	2	1	55.6	55.9

TRAFFIC NOISE ANALYSIS TOOL

Project Name: Royal Vista
Analysis Scenario: Future Baseline
Source of Traffic Volumes: Linscott, Law & Greenspan

Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Brea Canyon Cutoff Rd s/o Pathfinder Rd	Hard	30	45	45	40	2134	44	22	73.5	73.8
Colima Rd between Fairway Dr/Brea Canyon Cutoff Rd and Lake Canyon Dr	Hard	30	45	45	40	1840	38	19	72.8	73.1
Colima Rd between Lake Canyon Dr and Walnut Leaf Dr	Hard	30	45	45	40	1757	36	18	72.6	72.9
Colima Rd between Tierra Luna and S Lemon Ave	Hard	30	45	45	40	1798	37	19	72.7	73.0
Colima Rd between Walnut Leaf Dr and Tierra Luna	Hard	30	45	45	40	1729	36	18	72.6	72.9
Colima Rd w/o Fairway Dr/Brea Canyon Cutoff Rd	Hard	30	45	45	40	1940	40	20	73.1	73.4
East Walnut Dr South between Fairway Dr and Brookdale Walnut Entryway	Hard	30	35	35	30	223	5	2	60.6	60.9
East Walnut Dr South e/o Fairway Dr	Hard	30	35	35	30	222	5	2	60.6	60.9
East Walnut Dr South w/o Fairway Dr	Hard	30	25	25	25	445	9	5	60.6	60.9
Fairway Dr between East Walnut Dr South and Colima Rd	Hard	30	45	45	40	1854	38	19	72.9	73.2
Fairway Dr between SR-60 Eastbound Offramp and East Walnut Dr South	Hard	30	45	45	40	2175	45	22	73.6	73.9
Fairway Dr between SR-60 Westbound On/Off Ramp and SR-60 Eastbound Offran	Hard	30	45	45	40	1666	34	17	72.4	72.7
Fairway Dr n/o SR-60 Westbound On/Off Ramp	Hard	30	45	45	40	1061	22	11	70.4	70.7
Fairway Dr/Brea Canyon Cutoff Rd between Colima Rd and Pathfinder Rd	Hard	30	45	45	40	1856	38	19	72.9	73.2
Golden Springs Dr e/o S Lemon Ave	Hard	30	35	35	30	1942	40	20	70.0	70.3
Pathfinder Rd e/o Brea Canyon Cutoff Rd	Hard	30	45	45	40	1082	22	11	70.5	70.8
Pathfinder Rd w/o Brea Canyon Cutoff Rd	Hard	30	45	45	40	1457	30	15	71.8	72.1
S Lemon Ave n/o Golden Springs Dr	Hard	30	45	45	40	1321	27	14	71.4	71.7
S Lemon Ave s/o Golden Springs Dr	Hard	30	30	30	25	406	8	4	61.7	62.0
SR-60 Eastbound Offramp w/o Fairway Dr	Hard	30	45	45	40	845	17	9	69.4	69.7
SR-60 Westbound On/Off Ramp e/o Fairway Dr	Hard	30	45	45	40	647	13	7	68.3	68.6
SR-60 Westbound On/Off Ramp w/o Fairway Dr	Hard	30	45	45	40	501	10	5	67.2	67.5
Tierra Luna n/o Colima Rd	Hard	30	30	30	25	72	1	1	54.2	54.5
Walnut Leaf Dr s/o Colima Rd	Hard	30	30	30	25	103	2	1	55.7	56.0

TRAFFIC NOISE ANALYSIS TOOL

Project Name: Royal Vista
Analysis Scenario: Future Baseline + Project
Source of Traffic Volumes: Linscott, Law & Greenspan

Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Brea Canyon Cutoff Rd s/o Pathfinder Rd	Hard	30	45	45	40	2181	45	22	73.6	73.9
Colima Rd between Fairway Dr/Brea Canyon Cutoff Rd and Lake Canyon Dr	Hard	30	45	45	40	1963	40	20	73.1	73.4
Colima Rd between Lake Canyon Dr and Walnut Leaf Dr	Hard	30	45	45	40	1892	39	20	72.9	73.2
Colima Rd between Tierra Luna and S Lemon Ave	Hard	30	45	45	40	1813	37	19	72.8	73.1
Colima Rd between Walnut Leaf Dr and Tierra Luna	Hard	30	45	45	40	1791	37	18	72.7	73.0
Colima Rd w/o Fairway Dr/Brea Canyon Cutoff Rd	Hard	30	45	45	40	1982	41	20	73.1	73.4
East Walnut Dr South between Fairway Dr and Brookdale Walnut Entryway	Hard	30	35	35	30	301	6	3	61.9	62.2
East Walnut Dr South e/o Fairway Dr	Hard	30	35	35	30	300	6	3	61.9	62.2
East Walnut Dr South w/o Fairway Dr	Hard	30	25	25	25	445	9	5	60.6	60.9
Fairway Dr between East Walnut Dr South and Colima Rd	Hard	30	45	45	40	1924	40	20	73.0	73.3
Fairway Dr between SR-60 Eastbound Offramp and East Walnut Dr South	Hard	30	45	45	40	2277	47	23	73.7	74.0
Fairway Dr between SR-60 Westbound On/Off Ramp and SR-60 Eastbound Offran	Hard	30	45	45	40	1728	36	18	72.6	72.9
Fairway Dr n/o SR-60 Westbound On/Off Ramp	Hard	30	45	45	40	1079	22	11	70.5	70.8
Fairway Dr/Brea Canyon Cutoff Rd between Colima Rd and Pathfinder Rd	Hard	30	45	45	40	1898	39	20	73.0	73.3
Golden Springs Dr e/o S Lemon Ave	Hard	30	35	35	30	1943	40	20	70.0	70.3
Pathfinder Rd e/o Brea Canyon Cutoff Rd	Hard	30	45	45	40	1080	22	11	70.5	70.8
Pathfinder Rd w/o Brea Canyon Cutoff Rd	Hard	30	45	45	40	1455	30	15	71.8	72.1
S Lemon Ave n/o Golden Springs Dr	Hard	30	45	45	40	1334	28	14	71.4	71.7
S Lemon Ave s/o Golden Springs Dr	Hard	30	30	30	25	406	8	4	61.7	62.0
SR-60 Eastbound Offramp w/o Fairway Dr	Hard	30	45	45	40	885	18	9	69.6	69.9
SR-60 Westbound On/Off Ramp e/o Fairway Dr	Hard	30	45	45	40	650	13	7	68.3	68.6
SR-60 Westbound On/Off Ramp w/o Fairway Dr	Hard	30	45	45	40	523	11	5	67.4	67.7
Tierra Luna n/o Colima Rd	Hard	30	30	30	25	72	1	1	54.2	54.5
Walnut Leaf Dr s/o Colima Rd	Hard	30	30	30	25	103	2	1	55.7	56.0

Royal Vista

Vibration Level Calculations

Based on Federal Transit Administration, Office of Planning and Environment

N =	1.5

Construction Equipment	Project Equipment	Equipment Peak Particle Velocity @ 25 Feet* (inches/second)	Distance to Receptor for < 0.5 PPV (Feet)	Estimated Velocity Decibels @ Distance** (VdB)	Estimated Peak Particle Velocity @ Distance*** (inches/second)
Unmitigated Vibration Levels					
V1					
Pile Driver (Impact), Typical	Yes	0.644	50	95	0.228
Pile Driver (Sonic), Typical	Yes	0.170	50	84	0.060
Vibratory Roller	Yes	0.210	75	80	0.040
Hoe Ram	Yes	0.089	50	78	0.031
Earth Mover	Yes	0.011	50	60	0.004
Excavator	Yes	0.047	50	72	0.017
Fork Lift	Yes	0.047	50	72	0.017
Skid Steer	Yes	0.047	50	72	0.017
Wheel Loader	Yes	0.076	50	77	0.027
Large Bulldozer	Yes	0.089	50	78	0.031
Caisson Drilling	Yes	0.089	50	78	0.031
Loaded Trucks	Yes	0.076	50	77	0.027
Jackhammer	Yes	0.035	50	70	0.012
Small Bulldozer	Yes	0.003	50	48	0.001

Source:

Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual,* 2018.

Notes:

* Values taken from Table 7-4.

** Based on the formula VdB = 20 x LOG10 (v/v_{ref}), where v_{ref} is equal to 1×10^{-6} in/sec (see page 111).

The approximate rms vibration velocity level (v) is calculated from PPV using a crest factor of 4 (see page 184).

*** Based on the formula $PPV(D) = PPV(25\text{ ft}) \times (25/D)^{N}$, where D is equal to the distance (see page 185).

N = soil type classification factor (typically ranges from 1 to 1.5)

Summary

File Name on Meter	R1
File Name on PC	SLM_0005055_LxT_Data_080.01.ldbin
Serial Number	0005055
Model	SoundTrack LxT®
Firmware Version	2.402
User	
Location	Royal Vista
Job Description	
Note	

Measurement

Description	
Start	2021-03-18 08:18:33
Stop	2021-03-18 08:33:33
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre Calibration	2020-05-14 15:30:12
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamp	PRMLxT1
Microphone Correction	Off
Integration Method	Exponential
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Freq. Weighting	A Weighting
OBA Max Spectrum	Bin Max
Overload	144.6 dB

	A	C	Z
Under Range Peak	**100.5**	97.5	102.5 dB
Under Range Limit	**37.7**	37.4	44.4 dB
Noise Floor	28.6	28.2	35.3 dB

Results

LA_{Seq}	62.1 dB	
LASE	91.6 dB	
EAS	161.211 µPa²h	
EAS8	5.159 mPa²h	
EAS40	25.794 mPa²h	
$LA_{peak\ (max)}$	2021-03-18 08:23:20	80.7 dB
LAS_{max}	2021-03-18 08:20:23	64.1 dB
LAS_{min}	2021-03-18 08:28:57	60.1 dB
SEA	-99.9 dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
LC_{Seq}	70.3 dB	
LA_{Seq}	62.1 dB	
LC_{Seq} - LA_{Seq}	8.2 dB	
LAI_{eq}	63.1 dB	
LA_{eq}	62.1 dB	
LAI_{eq} - LA_{eq}	1.0 dB	

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	62.1					
$L_{S(max)}$	64.1	2021/03/18 8:20:23				
$L_{S(min)}$	60.1	2021/03/18 8:28:57				
$L_{Peak(max)}$	80.7	2021/03/18 8:23:20				

# Overloads	0
Overload Duration	0.0 s
# OBA Overloads	0
OBA Overload Duration	0.0 s

Summary

File Name on Meter	R2
File Name on PC	SLM_0005055_LxT_Data_081.01.ldbin
Serial Number	0005055
Model	SoundTrack LxT®
Firmware Version	2.402
User	
Location	Royal Vista
Job Description	
Note	

Measurement

Description	
Start	2021-03-18 08:44:17
Stop	2021-03-18 08:59:17
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre Calibration	2020-05-14 15:30:12
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamp	PRMLxT1
Microphone Correction	Off
Integration Method	Exponential
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Freq. Weighting	A Weighting
OBA Max Spectrum	Bin Max
Overload	144.6 dB

	A	C	Z
Under Range Peak	**100.5**	97.5	102.5 dB
Under Range Limit	**37.7**	37.4	44.4 dB
Noise Floor	28.6	28.2	35.3 dB

Results

LA_{Seq}	49.9 dB	
LASE	79.4 dB	
EAS	9.769 µPa²h	
EAS8	312.608 µPa²h	
EAS40	1.563 mPa²h	
$LA_{peak\ (max)}$	2021-03-18 08:49:39	78.9 dB
LAS_{max}	2021-03-18 08:46:05	64.3 dB
LAS_{min}	2021-03-18 08:58:20	41.6 dB
SEA	-99.9 dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
LC_{Seq}	61.6 dB	
LA_{Seq}	49.9 dB	
LC_{Seq} - LA_{Seq}	11.7 dB	
LAI_{eq}	51.9 dB	
LA_{eq}	49.9 dB	
LAI_{eq} - LA_{eq}	2.0 dB	

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	49.9					
$L_{S(max)}$	64.3	2021/03/18 8:46:05				
$L_{S(min)}$	41.6	2021/03/18 8:58:20				
$L_{Peak(max)}$	78.9	2021/03/18 8:49:39				

# Overloads	0
Overload Duration	0.0 s
# OBA Overloads	0
OBA Overload Duration	0.0 s

Summary

File Name on Meter	R3
File Name on PC	SLM_0005055_LxT_Data_082.01.ldbin
Serial Number	0005055
Model	SoundTrack LxT®
Firmware Version	2.402
User	
Location	Royal Vista
Job Description	
Note	

Measurement

Description	
Start	2021-03-18 09:06:34
Stop	2021-03-18 09:21:34
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre Calibration	2020-05-14 15:30:12
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamp	PRMLxT1
Microphone Correction	Off
Integration Method	Exponential
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Freq. Weighting	A Weighting
OBA Max Spectrum	Bin Max
Overload	144.6 dB

	A	C	Z
Under Range Peak	**100.5**	97.5	102.5 dB
Under Range Limit	**37.7**	37.4	44.4 dB
Noise Floor	28.6	28.2	35.3 dB

Results

LA_{Seq}	48.1 dB	
LASE	77.6 dB	
EAS	6.383 µPa²h	
EAS8	204.255 µPa²h	
EAS40	1.021 mPa²h	
$LA_{peak\ (max)}$	2021-03-18 09:18:44	73.0 dB
LAS_{max}	2021-03-18 09:18:45	59.5 dB
LAS_{min}	2021-03-18 09:14:05	43.4 dB
SEA	-99.9 dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
LC_{Seq}	60.5 dB	
LA_{Seq}	48.1 dB	
LC_{Seq} - LA_{Seq}	12.5 dB	
LAI_{eq}	50.0 dB	
LA_{eq}	48.0 dB	
LAI_{eq} - LA_{eq}	2.0 dB	

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	48.0					
$L_{S(max)}$	59.5	2021/03/18 9:18:45				
$L_{S(min)}$	43.4	2021/03/18 9:14:05				
$L_{Peak(max)}$	73.0	2021/03/18 9:18:44				

# Overloads	0
Overload Duration	0.0 s
# OBA Overloads	0
OBA Overload Duration	0.0 s

Dose Settings

Summary

File Name on Meter	R4
File Name on PC	SLM_0005055_LxT_Data_083.00.ldbin
Serial Number	0005055
Model	SoundTrack LxT®
Firmware Version	2.402
User	
Location	Royal Vista
Job Description	
Note	

Measurement

Description	
Start	2021-03-18 09:31:21
Stop	2021-03-18 09:46:21
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre Calibration	2020-05-14 15:30:12
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamp	PRMLxT1
Microphone Correction	Off
Integration Method	Exponential
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Freq. Weighting	A Weighting
OBA Max Spectrum	Bin Max
Overload	144.6 dB

	A	C	Z
Under Range Peak	**100.5**	97.5	102.5 dB
Under Range Limit	**37.7**	37.4	44.4 dB
Noise Floor	28.6	28.2	35.3 dB

Results

LA_{Seq}	46.9 dB	
LASE	76.5 dB	
EAS	4.940 µPa²h	
EAS8	158.067 µPa²h	
EAS40	790.336 µPa²h	
$LA_{peak\ (max)}$	2021-03-18 09:41:54	87.3 dB
LAS_{max}	2021-03-18 09:35:50	55.1 dB
LAS_{min}	2021-03-18 09:41:19	43.8 dB
SEA	-99.9 dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
LC_{Seq}	58.4 dB	
LA_{Seq}	46.9 dB	
LC_{Seq} - LA_{Seq}	11.5 dB	
LAI_{eq}	50.1 dB	
LA_{eq}	46.9 dB	
LAI_{eq} - LA_{eq}	3.1 dB	

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	46.9					
$L_{S(max)}$	55.1	2021/03/18 9:35:50				
$L_{S(min)}$	43.8	2021/03/18 9:41:19				
$L_{Peak(max)}$	87.3	2021/03/18 9:41:54				

# Overloads	0
Overload Duration	0.0 s
# OBA Overloads	0
OBA Overload Duration	0.0 s

Summary

File Name on Meter	R5
File Name on PC	SLM_0005055_LxT_Data_084.00.ldbin
Serial Number	0005055
Model	SoundTrack LxT®
Firmware Version	2.402
User	
Location	Royal Vista
Job Description	
Note	

Measurement

Description	
Start	2021-03-18 09:56:16
Stop	2021-03-18 10:11:16
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre Calibration	2020-05-14 15:30:12
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamp	PRMLxT1
Microphone Correction	Off
Integration Method	Exponential
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Freq. Weighting	A Weighting
OBA Max Spectrum	Bin Max
Overload	144.6 dB

	A	C	Z
Under Range Peak	**100.5**	97.5	102.5 dB
Under Range Limit	**37.7**	37.4	44.4 dB
Noise Floor	28.6	28.2	35.3 dB

Results

LA_{Seq}	61.6 dB	
LASE	91.1 dB	
EAS	143.682 µPa²h	
EAS8	4.598 mPa²h	
EAS40	22.989 mPa²h	
$LA_{peak\ (max)}$	2021-03-18 10:08:16	91.1 dB
LAS_{max}	2021-03-18 10:10:25	73.1 dB
LAS_{min}	2021-03-18 10:03:52	39.5 dB
SEA	-99.9 dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
LC_{Seq}	66.2 dB	
LA_{Seq}	61.6 dB	
LC_{Seq} - LA_{Seq}	4.7 dB	
LA_{leq}	62.6 dB	
LA_{eq}	61.6 dB	
LA_{leq} - LA_{eq}	1.1 dB	

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	61.6					
$L_{S(max)}$	73.1	2021/03/18 10:10:25				
$L_{S(min)}$	39.5	2021/03/18 10:03:52				
$L_{Peak(max)}$	91.1	2021/03/18 10:08:16				

# Overloads	0
Overload Duration	0.0 s
# OBA Overloads	0
OBA Overload Duration	0.0 s

Summary

File Name on Meter	R6
File Name on PC	SLM_0005055_LxT_Data_085.00.ldbin
Serial Number	0005055
Model	SoundTrack LxT®
Firmware Version	2.402
User	
Location	Royal Vista
Job Description	
Note	

Measurement

Description	
Start	2021-03-18 10:15:51
Stop	2021-03-18 10:30:51
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre Calibration	2020-05-14 15:30:12
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamp	PRMLxT1
Microphone Correction	Off
Integration Method	Exponential
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Freq. Weighting	A Weighting
OBA Max Spectrum	Bin Max
Overload	144.6 dB

	A	C	Z
Under Range Peak	**100.5**	97.5	102.5 dB
Under Range Limit	**37.7**	37.4	44.4 dB
Noise Floor	28.6	28.2	35.3 dB

Results

LA_{Seq}	61.1 dB	
LASE	90.7 dB	
EAS	129.257 µPa²h	
EAS8	4.136 mPa²h	
EAS40	20.681 mPa²h	
$LA_{peak\ (max)}$	2021-03-18 10:16:03	85.2 dB
LAS_{max}	2021-03-18 10:16:03	71.5 dB
LAS_{min}	2021-03-18 10:20:36	45.3 dB
SEA	-99.9 dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
LC_{Seq}	66.6 dB	
LA_{Seq}	61.1 dB	
LC_{Seq} - LA_{Seq}	5.5 dB	
LA_{leq}	62.0 dB	
LA_{eq}	61.1 dB	
LA_{leq} - LA_{eq}	0.9 dB	

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	61.1					
$L_{S(max)}$	71.5	2021/03/18 10:16:03				
$L_{S(min)}$	45.3	2021/03/18 10:20:36				
$L_{Peak(max)}$	85.2	2021/03/18 10:16:03				

# Overloads	0
Overload Duration	0.0 s
# OBA Overloads	0
OBA Overload Duration	0.0 s